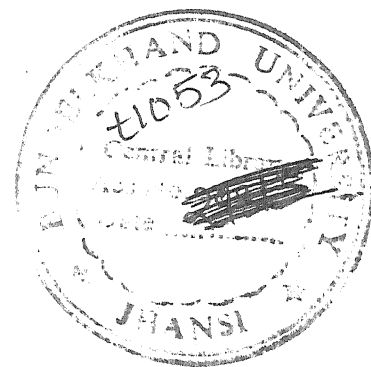


**A STUDY OF 'SIGMOIDOSCOPY VERSUS  
BARIUM ENEMA' IN THE EVALUATION  
OF DISEASES OF LOWER GASTRO-  
INTESTINAL TRACT**

**THESIS**  
FOR  
**DOCTOR OF MEDICINE**  
( MEDICINE )



**BUNDELKHAND UNIVERSITY  
JHANSI (U. P.)**

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DEDICATED

TO

MY FATHER AND MOTHER

WHO HAVE BEEN A CONSTANT

SOURCE OF ENCOURAGEMENT

AND

INSPIRATION

TO

ME

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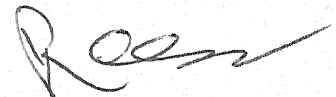


C E R T I F I C A T E

This is to certify that the research work entitled "A STUDY OF SIGMOIDOSCOPY VERSUS BARIUM ENEMA IN THE EVALUATION OF DISEASES OF LOWER GASTROINTESTINAL TRACT", which is being submitted as a thesis for M.D. (Medicine) Examination, 1991 of Bundelkhand University, has been carried out by Dr. Anand Kumar Pant in the Department of Medicine and Radiology, M.L.B. Medical College, Jhansi.

He has put the necessary stay in the department as per university regulations.

Dated: 30 Nov., 1990.

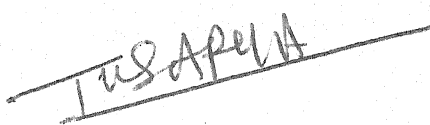


( R. C. Arora )  
M.D., D.Sc.,  
Professor and Head,  
Department of Medicine,  
M.L.B. Medical College,  
Jhansi.

C E R T I F I C A T E

Certified that the present research work entitled "A STUDY OF SIGMOIDOSCOPY VERSUS BARIUM ENEMA IN THE EVALUATION OF DISEASES OF LOWER GASTROINTESTINAL TRACT", has been conducted by Dr. Anand Kumar Pant under my guidance and supervision. The techniques and statistics mentioned in the thesis were actually undertaken by the candidate himself.

Dated: 30 Nov., 1990.


  
(Tung Vir Singh Arya)  
M.D., F.M.G.E.M.S.,  
Lecturer in Medicine,  
M.L.B. Medical College,  
Jhansi.

(GUIDE)

C E R T I F I C A T E

Certified that the present research work  
entitled "A STUDY OF SIGMOIDOSCOPY VERSUS BARIUM ENEMA  
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statistics mentioned in the thesis were actually  
undertaken by the candidate himself.

Dated: 30 Nov., 1990.

  
( A. K. Gupta )  
M.D.,  
Reader,  
Department of Radiology,  
M.L.B. Medical College,  
Jhansi.

(CO-GUIDE)

## A C K N O W L E D G E M E N T

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To day, when I pick up my pen to express my heart felt thanks to all those who helped me realise what I consider so dear, I have no death of feelings but only an understanding of the futility of my expression. For, I am sure, I can never manage to bringforth my sincere gratitude towards all who have meant so much in the formation of this thesis. Yet, I shall try.

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Last but not least, I wish to express my thanks to Mr. Phool Chandra Sachan for his back breaking task for preparing accurate type script.

Dated: 30 Nov., 1990.

  
( Anand Kumar Pant )

## C O N T E N T

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## INTRODUCTION

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## INTRODUCTION

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There has been a deep quest in the minds of persons associated with medical sciences to directly visualise pathologies lying inside the body. This led to the invention of Endoscopes. Sigmoidoscope is one of the tools of this armamentarium (Paulson, 1930). The arrival of these instruments brought revolution in the diagnostic as well as therapeutic procedures.

Sigmoidoscopy is the single most important diagnostic method for the patients with colonic disease (Isselbacher and Richter, 1983). The importance of the test is demonstrated by the observations that (i) 75 percent of all colonic cancers are within the reach of the sigmoidoscope. (ii) Small recto sigmoid-tumours may be missed on examination after barium enema because of tortuosity and redundancy of the intestine in this area. If all patients with suspected colonic lesions were subjected to sigmoidoscopy on the first physician visit, the earlier diagnosis of these lesions would almost certainly improve the long term outlook for colonic cancer. In addition to its obvious value in cancer, sigmoidoscopic examination permits identification of a large number of benign diseases.



Performance of sigmoidoscopy before barium enema examination of the colon has long been a standard advice in clinical gastroenterology. In particular, sigmoidoscopy can detect inflammatory and neoplastic condition of rectum and sigmoid colon more quickly and reliably than a barium enema. Many hospitals, however, allow general practitioners open access to barium enema but not to sigmoidoscopy so that the classical sequence may be bypassed.

Donald et al (1985) found a total of 516 abnormalities to account for symptoms in 506 patients giving a diagnostic rate of 35 percent. The most common lesion was piles (307 cases), other relatively common disorders include inflammatory bowel diseases (107 cases), benign tumours (44 cases) and malignant tumours (38 cases) of 41 patients subsequently undergoing sigmoidoscopy, a cause for the bleeding was found in 32 patients, the most common benign malignant tumour (16 cases).

Sigmoidoscopic and radiologic studies of the bowel are most important in establishing the diagnosis

of inflammatory bowel disease of the bowel. Sigmoidoscopy must be performed in all patients presenting with chronic diarrhoea and in all instances of rectal bleeding, while barium enema examination of the perfectly prepared colon may disclose the earliest changes of mucosa in either ulcerative colitis, a conventional barium enema examination is often normal in early disease. Direct visualization of colonic mucosa combined with biopsy is the most sensitive way of determination whether rectal inflammation is present. It can often be performed without prior enema preparation in the patients having acute diarrhoea. The goal of sigmoidoscopy is to establish whether mucosal inflammation is present and not necessarily to determine its full extent at the initial examination. Thus if sigmoidoscopic changes are encountered within the first 8-10 cms, it is not necessary to pass the instrument to its full length which may cause discomfort when bowel is acutely inflamed (Robert-Glickman, 1987).

The diagnostic superiority of sigmoidoscope has also helped in determining the cause of unexplained rectal bleeding (Gaisford, 1978).

In certain instances when the mesentric occlusion is suggested, the diagnosis may be made or enhanced by sigmoidoscopy (Corter et al, 1959 and Littman et al, 1963).

More accurate bacteriologic and parasitologic determinations are possible when smears are prepared and media inoculated promptly at table with the help of sigmoidoscope (Paulson, 1930; Paulson and Andrews, 1927).

Sigmoidoscopy has also been found to be helpful in realising large bowel - obstructions (Thow and Jackman, 1963).

Biggan and Arafa demonstrated the schistosomal rectal lesions with the help of sigmoidoscopes.

With the help of flexible sigmoidoscopes, the procedure has become more convenient (Goldman et al, 1980). The sigmoidoscopy has gained so much popularity due to its reliability in the diagnosis that periodic

health examinations and cancer detection surveys are considered incomplete without procto sigmoidoscopy (Crumpacker and Backer, 1961; and Messlar, 1967).

By far the most significant complication from sigmoidoscopic examination of the rectosigmoid is that to perforation (Andresen, 1947). Bolt (1971) has reported that perforation can be expected in from 0.002 to 0.07% of patients and that death resulting from the procedure in the asymptomatic individual should approach zero. Other reported but less frequent complications from procto-sigmoidoscopic examination have been listed by Weiss (1972). These include cardiac arrest secondary to vagovagus reflex, post instrumentation and post biopsy bleedings, bacteremia, explosion of bowel gas where fulgurating current has been used without suction or without proper bowel preparation, fainting episodes secondary to vasomotor collapse, perforation by the sigmoidoscope and perforation due to preparatory cleaning or to electrosurgery.

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REVIEW OF LITERATURE

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## REVIEW OF LITERATURE

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By standards of good medical practice sigmoidoscopy is required in any patient with symptoms referable to the colon and rectum and in any patient in whom stool specimen is positive for gross blood or for occult blood. The need for annual routine sigmoidoscopy in the asymptomatic person older than 40 years is debatable. The frequency of detection of unsuspected abnormalities that occur within the range of 25 cms sigmoidoscopy varies from clinic to clinic. The truly routine sigmoidoscopic examination is of primary value in detection of benign polypoid lesions of sigmoid colon and rectum. Polyps of varying size may be found in 4 to 9.7 per cent of asymptomatic individuals older than 40 years. Bolt (1970) has reported that routine sigmoidoscopic examination resulted in discovery of single or multiple polyps in 9.6 percent and asymptomatic cancer in only 0.2 percent of patients examined. In a series of 14,370 routine initial examinations, Gilbertson (1968) reported the findings of 20 carcinomas or 1 in 712. Other studies have confirmed the findings of 1-3 cancer per 1000 routine examinations

(Bohlman et al, 1977). Only 12 to 13 percent of tumours of colon and rectum are within the reach of examining finger. If 20 cms of colon and rectum can be visualised with sigmoidoscope, 65 percent of all tumours of the colon and rectum can be seen, and if only 15 cms can be visualized, 50 percent of all tumours of the colon and rectum can be brought into view.

All agree, however, that sigmoidoscopy is indicated in any patient with symptomatology referable to colon and rectum. Other authors, because of mounting evidence for a polyp cancer relationship, hold the merit of routine sigmoidoscopic examination in screening for carcinoma of the colon. They base this judgement on the high incidence of carcinoma and on the potential for complete cure if diagnosed very early when only mucosal involvement is evident. Proponents of this view argue that (1) benign polyps are commonly found in patients with carcinoma of the colon, (2) carcinoma is sometimes seen in continuity with benign tissue within a polyp, (3) one occasionally discovers minute cancer in a patient with non inflammatory intestinal diseases (4) Hereditary multi-



ple adenomatous colonic polyps carry nearly 100 percent risk of carcinoma and (5) The larger the size of polyp, the more likely it will be cancerous. Furthermore, one study by Crespi et al (1978) has suggested that the removal of a polyp can reduce the incidence of carcinoma of colon. Lipshutz and associates (1979) and other supporters of routine sigmoidoscopic screening of asymptomatic patients conclude that it is justified despite objections to the poor cost benefit ratio in diagnosing large bowel cancer. Corman and associates (1975) have recommended that sigmoidoscopy should be performed annually for any patients who had a history of rectal polyps or carcinomas. For patients 50 years or older, sigmoidoscopy should be performed routinely every two years in accordance with the data presented by Spratt (1970), who states that doubling time for carcinomas of colon is in excess of 600 days, thus implying that routine annual examinations are not indicated.

Sigmoidoscopy and the barium enema have historically been extremely valuable diagnostic tools in the study of colonic disease. Since the barium enema provided



an examination far beyond the capability of sigmoidoscopy, which could be used to directly examine the more difficult areas of radiologic evaluation, the two techniques were obviously complementary. Current evidence shows that sigmoidoscopy and barium enema are also complementary. Each technique has its distinct advantages and disadvantages. The modern clinician must be fully aware of the relative merits of each method in order to utilize these tools effectively.

Sigmoidoscopy has limitations (Marrs, 1974 and Stevenson, 1980). The examiner is unable to negotiate extremely acute bends, and lesions may not be reached. Blind areas encountered most frequently are in rectosigmoid colon. Fixation and constriction of the colon from adhesions, inflammation, neoplasms and diverticula limit the skill of examiner.

The barium enema is often superior for localising a lesion prior to surgery. Measurements from the sigmoidoscope cannot be transferred to the patient at laprotomy because of bowing and telescoping of the colon on the sigmoidoscope.

The advantages of sigmoidoscopy relate to detecting mucosal changes, polyps and vascular lesions too subtle for barium enema study and to providing biopsy material. Williams et al (1974) reported that only 18 per cent of sigmoidoscopically diagnosed polyps of less than 1 cms were seen by conventional single contrast barium enemas, although 78 percent of such polyps were seen by air contrast examinations. Similarly Miller (1974) confirmed that 40 percent more colonic polyps were seen by air contrast enemas than by conventional single contrast enemas. Williams et al (1974) also reported that air contrast barium enema identified a very respectable 98 percent of sigmoidoscopically diagnosed polyps greater than 1 cms. Recently, Gilbertson et al (1979) showed that the single contrast barium enema misses 35 percent of all colonic carcinomas and 42 percent of early (Duke's A and B) potentially curable carcinomas. Recently, Thorpe et al (1981) concluded that the air contrast enema detected 96 percent of Duke's C and D lesions and 91 percent of Duke's A and B lesions in proven carcinoma of the colon.

Wells (1981) said that it takes 50 to 100 years from the time the perception occurs that something ought to be done until a serious attempt is made to do it. In the detection of curable colonic cancer, we clearly do not have and cannot afford that time. In the majority of the cases, if the examiner does not have a good facility of barium enema for guidance before sigmoidoscopy, it is the endoscopist own fault.

Sigmoidoscopy has a distinct advantage in the diagnosis of small polyps and a small, although important advantage in the detection of larger polyps. Occasionally, the barium enema will not only detect large missed polyps but even a 4 cms malignant neoplasm of caecum that had been missed at endoscopy (Saunders et al, 1971 and Wolff et al, 1975). For this reason sigmoidoscopy and barium enema are complementary examinations.

There were 94 cases of polypoid colonic lesions from a study of "Roscoe E. Miller (1975) where sigmoidoscopy failed to identify any of these polyps, even though the sigmoidoscope was-at-or beyond the site of the lesion. Twenty five of the lesions were carcinomas. Most

undetected lesions ranged from 0.5 to 1.5 cms. Histologic proof of each lesion was obtained by repeat sigmoidoscopy with biopsy, polypectomy or surgery.

An incomplete examination obviously accounts for the failure to identify colonic lesions by sigmoidoscopy in many cases. Also, the operator may miss a lesion just as the radiologist fails to see a lesion at fluoroscopy or on film. The problem is that if the endoscopist reaches or passes the area in question and does not see a lesion, an endoscopy report of normal cannot be checked. The fluoroscopist radiographs can be reviewed.

The greatest assets of sigmoidoscopy are those of combined biopsy or polypectomy. With minimal additional time, cost, and patient risk, lesions can be biopsied or polypoid lesions removed by electrocautery. Polypectomy subsequently spares the patient the time, cost and radiation exposure of annual repeat barium enema to follow changes in polyp size. After complete polypectomy, a repeat barium enema or sigmoidoscopy is suggested for the first year initially and then repeated every 3 to 5 years and alternated if no new polyps are found. Such a programme, combined with annual clinical follow up and

sigmoidoscopy, avoids both unnecessary sigmoidoscopies and barium enemas (Williams et al, 1974). Despite the assets of sigmoidoscopy, most endoscopist agree that the barium enema and sigmoidoscopy should remain the primary examinations for patients with suspected colonic-disease. Wolff et al (1975) believe that sigmoidoscopy serves as a back ground procedure to the barium enema. Errors of interpretation of barium enema roentgenograms are more common than failure of the barium enema technique itself. If anything radiologist tend to slightly under read barium enema studies with cooperative feedback the sigmoidoscopy findings make a careful review of the X-ray films an enlightening and beneficial learning experience for both the radiologist and endoscopist.

In recent years the usefulness of the barium enema has been challenged by endoscopist with increasing recommendations that endoscopy replace radiology for initial examination of the colon (Fork, 1981).

Advocacy of sigmoidoscopy for initial examination of the colon has been based on claims that the barium enema is far less accurate than endoscopy. Virtually

all of these claims, however, are derived from endoscopic studies in whom sigmoidoscopy was used an infallible "Gold Standard". Also the comparison was usually between excellent endoscopy done by recognised experts and poorly controlled radiologic examinations (Gelfand et al, 1984). Under these circumstances, the barium enema was inevitably found inferior to sigmoidoscopy. Since it was predetermined by the design of comparison.

In recent years, the sensitivity of the barium enema as reported by radiologist has averaged approximately 90 percent, for detection of adenomatous polyps, carcinoma, and idiopathic colitis (Ketyn et al, 1978 and Gelfant, 1981). The properly performed barium enema is similarly sensitive, except for the detection of polyps smaller than 1 cms and of early inflammatory bowel disease, especially that limited to recto sigmoid colon. On the other hand, the positive predictive value for radiologic diagnosis of polyps has been shown to be about 90 percent (Ott et al, 1983). The relatively few false positive errors are due to stool, diverticulae or misinterpretation of normal anatomy (Ott et al, 1983). Most importantly thorough bowel cleansing



is essential to obtaining an accurate radiologic examination of the colon regardless of technique used.

The sensitivity of sigmoidoscopy is apparently similar to that of radiologic examination of the colon. The reported false negative error rate for polypoid lesions has ranged from 3 percent to 22 percent with an average of 12 percent (Leinicke et al, 1977 and Abrams, 1982). Virtually identical to false negative error rate for polyp detection by the barium enema. Sigmoidoscopy also fails occasionally to detect carcinomas of the colon, with an error rate reported as high as 10 percent (Abrams, 1982). A major attribute of sigmoidoscope is that the false positive error rate is essentially nil. In all of these comparative reports, the combined sensitivity of the radiologic examination and sigmoidoscopy has approached 100 percent, which emphasizes their complementary roles.

The major cause for errors during sigmoidoscopy is failure to examine the entire colon. Further more, the implication of incomplete sigmoidoscopy has not been satisfactorily addressed by endoscopist. In two recent reports, for example, approximately 17 percent sigmoido-

scopies fail to visualize colonic malignancy (Obrecht et al, 1984 and Benner et al, 1983). This becomes a serious limitation of sigmoidoscopy when variable competence of the examiner and performance of the examinations without fluoroscopy are considered. Under these circumstances, a substantial minority of the examinations are in fact likely to be incomplete (Panish, 1980). The error rate for missed neoplasms introduced by this limitation alone almost certainly exceeds that of the properly done barium enema.

The contribution of examiner competence to accuracy of the radiologic or endoscopic examination of the colon has not been sufficiently stressed.

The various results reported for the radiologic detection of colonic lesions, particularly polyps is mainly dependent upon the competence of the radiologists involved. The similar dependance upon examiner competence during sigmoidoscopy has not received equal attention even though marked variability in training and experience is evident among clinicians currently performing sigmoidoscopy, implying that the results of this technique are likely to be at least as variable as those



reported for the radiologic examination ( Max et al, 1982 and Overholt, 1984). Although expert sigmoidoscopy detects most colonic lesions, in less experienced hands incomplete examinations are more likely and a larger proportion of colonic lesions are missed.

Hughes (1957) stated that 25 percent of sigmoidoscopies fail to go to the full length of 25 cms which Jackman (1958) quotes 14.8 percent of failure in 19,294 examinations at the Mayo Clinic in 1955. Full insertion failed in 58 percent in some study which represents a partially selected group since many were referred for barium enema examination for this reason.

According to estimate of the American Cancer Society, 1973, new cases of cancer of the colon will be found in 99,000 Americans at the same time, 48,000 American will be die of that disease. The situation need not continue to be this grim, since cancer of the colon is highly curable if it is treated early. Selected studies report a 71 percent five year survival rate after surgery of localised disease (Franklin et al, 1970).

The barium enema is the principal method for detecting colon cancer other than by direct visualisation

with sigmoidoscope.

The recent introduction of fiberoptic sigmoidoscopy is a helpful diagnostic addition in the detection of cancer of colon (Simon, 1980). However, the expense of this examination is far greater than that of a barium enema and the number of instrument available, as well as of skilled physician to use them, is quit limited. These different methods of detection are not competitive but rather complement each other. One technique may find a lesion the other does not; each is a check on the other.

While frequently requested, the barium enema, regrettably, is probably the most neglected and poorly done examination in the field of radiology, the reason why is that 18 percent of more carcinomas of the colon are completely missed. On the initial barium enema examination (Saunders et al, 1971). All too often, what passes for a "Normal colon study" consists of two or three views of a fecal filled large bowel that shows no grossly obstructing carcinoma (Rogers, 1971). Eyler (1973) reported in one study that in 75 percents of missed colon carcinomas, the radiologist had mistaken the carcinoma for poor preparation or had described poor

preparation, but left the choice of repeating the examination to the clinician. Most missed carcinomas of the colon are due to poor preparation, faulty technique and inadequate attention to detail rather than to an inherent invisibility. Roentgenologic detection of colon cancer is limited to the recognition of macroscopic disease, but can even detect lesions that measure only a few millimeters (Andren et al, 1955 and Welin, 1958). Currently a 4 to 5 mm tumour in any part of the colon from the anus to appendix is detectable. This is the present limitation of diagnostic roentgenology for colonic carcinoma, and it is also the goal of proficiency toward which the radiologist should continually aspire (Sherman, 1960). Because the end result of missing a cancer of colon is so serious, any physician performing a barium enema should be held to the standard demand of the expert.

With a 71 percent, five year survival rate for early carcinoma as contrasted with a 13 percent survival rate for extensive lesions (Evans et al, 1978), the radiologist must assume the major responsibility for finding early lesions well established.

Barium enema is clearly a safer procedure than sigmoidoscopy. Complication from barium enema examination are relatively rare. Perforation of the rectum is the most serious and frequent complication having a reported incidence ranging from 0.008 to 0.04 percent (Gelfand, 1980). Improper use of enema tips particularly those equipped with a balloon is the most common cause of rectal perforation. Death from radiologic examination of the colon is almost non existent . Kempmann and Kempgens (1974) recommended several precautionary measures to reduce the incidence of colonic perforation. Lefrock and Co-workers (1975) have stressed the fact that transient bacteremia is associated with barium enema examination.

On the other hand, the 1974 American Society of Gastrointestinal endoscopy (ASGE) survey of complications relating to diagnostic sigmoidoscopy showed a morbidity of 0.32 percent and mortality of 0.008 percent (Rogers et al, 1975). In a more recent ASGE survey of 700 diagnostic sigmoidoscopies, the reported complication and fatality rates were 1.7 percent and 0.1 percent respectively (Gilbert et al, 1983). Apparently, greater experience and improvements in instrumentation have not

reduced the risk of sigmoidoscopy. Assuming an average complication rate of 1 percent and mortality of 0.05 percent for performance of sigmoidoscopy its substitution for the 5 million barium enema done each year would result in 50,000 complication and 2500 deaths annually. It is believed, thus, most sigmoidoscopic complications occur among unqualified clinician under published guidelines of ASGE (1983).

In the United Kingdom, Large bowel cancer is now second only to lung cancer and responsible in England and Wales for 17,000 deaths per year (Mortality statistics, 1974). There is evidence in U.K. that incidence of colorectal cancer is increasing while studies from U.S.A. suggest that the disease is migrating anatomically in a cephalic direction (Cady et al, 1974 and Rhodes et al, 1977), with proportionately more diagnoses above the rectosigmoid junction. This observation is supported by a decline in deaths from cancer of rectum and sigmoid colon and an increase in deaths from lesions above the sigmoid (Snyder et al, 1977). Thus, the classical teaching that a half of all colorectal cancers were within the reach of a properly performed rectal examination no longer holds true.



Similarly the number of lesions within reach of the rigid sigmoidoscope has fallen from three quarters to about half while the number of right sided cancer has risen from 10 percent to about 25 percent of malignant colonic lesions.

The prognosis for the patient who is found to have a colorectal carcinoma is still generally poor. In the north east of Scotland as recently as 1980, half of all patients were considered incurable at the time of diagnosis (Clarke et al, 1980), while in the Br  mingham region the five year survival figures did not exceed 22 percent in over 12,000 cases (Slaney, 1971). In highly specialised centres, five year survival rates of 50 percent have been reported. At the time of diagnosis and the histological assessment including the Dukes' staging and grade of tumour. The Duke's staging of colorectal cancers gives an approximate five year survival for various grades of lesions, 'A' lesion - 79 percent, 'B' lesion - 58 percent, 'C' lesions - 37 percent and all patients with distant metastasis are dead within three years. Patients in whom colorectal cancers has been detected at an asymptomatic stage have been reported to have survival rates as

high as 90 percent at 15 years (Hertz, 1979). The widespread application of rigid sigmoidoscopy and the painstaking work of Morson (1976) and others (Lane et al, 1979) have identified the importance of adenomatous polyp in the genesis of colorectal cancer. Mass-screening studies using the rigid sigmoidoscope have shown that the removal of all asymptomatic adenomatous polyps found at routine sigmoidoscopy will result in both a decline in the incidence of rectal cancer and improved survival in those few individuals who do develop a malignancy. Gilbertson and his colleagues (1974) carried out 1,04,000 sigmoidoscopies in 18,000 asymptomatic individuals over a 25 years old patients. They detected only 11, cancer in a total of 85,000 patients, all either Dukes' stage A or B. This finding of 11 percent with cancer was against an expected 75-80 patients with cancer. In United States, 99,000 new cases of colorectal carcinomas are being diagnosed each year (American Cancer Society, 1974). Although it is potentially curable through surgery, salvage rates have remained relatively static over the past two decades (Silverbag, 1974; Mc-Swain et al, 1962; and Welch et al,

1974) despite strong suggestive evidence that at least three or four patients might be saved by earlier diagnosis and prompt treatment (Beahrs et al, 1971, Crumpaker et al, 1961 and Seaudamore, 1969). Heretofore, the twin pillars of diagnosis have been sigmoidoscopy and contrast enema. The potential yield by sigmoidoscopy alone may be diminishing, formerly 65 to 75 percent of large bowel cancers were judged to be within the reach of the sigmoidoscope (Bolt, 1971 and Vynalek et al, 1947), but recent reports indicate a change in patterns of distribution, so that now many more of these lesions occur above the level of rectosigmoid colon (Mc Swain et al, 1962; Axtell et al, 1966, and Wolff et al, 1974). If, then, we are to rely on the barium enema study for early diagnosis, we have recognised limitations in terms of accuracy, particularly with respect to detection of small lesions. The range of errors in diagnostic accuracy is reported to be from 8 percent to as high as 28 percent, (Ramsey, 1956; Martel et al, 1971 and Allcock, 1958). If the air contrast study or Malmo technique is utilized, these figures can be improved (Welin, 1967). Under any circumstances some of the highest rates of detection failure apply to



colonic polyps, now more widely accepted as precursors to cancer.

A study by Wolff et al (1975) in which a positive radiologic report was delivered in 376 cases out of 500 cases. The pertinent radiologic findings occurred at the following locations : rectosigmoid, 3 percent; sigmoid 50 percent; descending colon, 27 percent, transverse colon 12 percent; Ascending colon and caecum, 8 percent. Eighty eight cases were radiologically negative and in thirty six instances a technically satisfactory contrast enema could not be obtained. The major positive entities reported by radiologist (or gastro-enterologist) were polyp or polyps, 185 cases; diverticulosis coli, 89; carcinoma, 24; inflammatory bowel disease, 14; obstructing lesion, 9; caecal abnormality, 34; miscellaneous, 21;. Intraluminal contrast examination of the colon, barium enema, is still a mainstay in the detection of colonic abnormalities. Its usefulness in the diagnosis of colonic neoplasms, benign colonic polyps, diverticulosis and large bowel bleeding continues to be well accepted. The usefulness of the barium enema examination in the follow up of patients with previous carcinoma of the colon and rectum

and of patients with polypoid disease of the colon remains unchallenged. Despite the increased use of sigmoidoscopy in evaluation of colonic problems, the barium enema continues to be a complementary rather than competitive diagnostic approach. Limitations of the barium enema, however, should be recognized. The range of error in diagnostic accuracy with the standard full column barium enema has been earlier described to be from 8 percent to 28 percent (Wolff et al, 1975). Specific areas of colon and rectum in which barium enema examination is compromised include (i) the lower portion of the rectum because of the overlying pelvic bones and because mucosal lesions of lower rectum can sometimes be over looked with the use of a balloon tipped enema tube and (ii) all the areas where the colon may "double back" on itself, such as the sigmoid colon, the splenic flexure and the hepatic flexur and (iii) the caecum, because of its patulous nature. These various areas of large bowel can sometimes also be difficult to evaluate completely by the use of fibroptic sigmoidoscope; indeed, Wolff and coworkers (1975) reported that caecal lesions, that were shown to

be present radiographically, were not detected by sigmoidoscopy, and were proven to be present at subsequent operation. Despite the short comings, the barium enema evaluation of the large bowel is a most valuable diagnostic tool, and its accuracy improves with proper preparation of the patient and with knowledge of those areas of the large bowel that are notoriously prone to giving falsely negative results.

Full column standard barium enema study has, as one of its short comings, the failure to detect mucosal lesions and small polypoid lesions of the large bowel. Thoeni and Menuck (1977) compared findings in 210 patients examined by both barium enema and sigmoidoscopy. They found a total of 219 polyps in 112 patients. Single contrast (standard) barium enema examination missed 45 percent of polyps whereas double contrast (air contrast) barium enema examination missed only 11.7 percent of polyps. In the same study, sigmoidoscopy failed to detect less than 3 percent of polyps that had been seen on double contrast barium enema examination. In addition 10 percent of polyps detected by double contrast barium enema evaluation could not be reached by sigmoidoscope.

Thoeni and Menuck (1977) concluded that double contrast barium enema study and sigmoidoscopy are complementary in detecting small colonic polyps. Their data indicated that the right side of the colon could be evaluated with the difficulty by double contrast barium enema examination that by sigmoidoscopy. They advised that a double contrast barium enema study be performed initially when searching for small polypoid defects, followed by, sigmoidoscopy, especially if the lesion in question is 1 cm or greater in diameter. They recommended that if sigmoidoscopy fails to identify a polyp demonstrated by double contrast barium enema study the radiograph examination should be repeated for confirmation and if the results are still abnormal then a second sigmoidoscopy should be considered. The use of air contrast barium enema examination, therefore, has definitely increased the diagnostic accuracy of roentgenographic evaluation of the colon and should be included in all those patients in whom mucosal lesions are suspected and in whom bleeding from a large bowel source is proven but a lesion has not been found on standard full column barium enema study.

Donald et al (1985) showed the feasibility of offering an open access sigmoidoscopy proctoscopy service to general practitioners and insisting on a sigmoidoscopy before a barium enema. With about 500 sigmoidoscopies a year, the service is seeing nearly three times as many patients as used to be referred for barium enema, so evidently it has proved popular with general practitioners, and this is born out by their response to questionnaire. It has easily fitted into a morning endoscopic session, taking on average one and a half hours for two operators and requiring roughly six nursing hours to look after patients and prepare and clean the instruments. The service was set up in an endoscopy unit which had already offered open access oesophagogastroduodenoscopy. Interestingly, the diagnostic yield of 35 percent is almost identical with the 33 percent from the oesophagogastroduodenoscopy service (Gear et al, 1980).

Not surprisingly, piles were the most frequent abnormal findings. The incidence of inflammatory bowel disease was perhaps high, however, amounting to 10.2 cases/ $10^5$  population/year. This compares with the estimated



incidence of ulcerative colitis in Britain of 7.2 cases/ $10^5$ /year (Morris et al, 1968-77) and rectal crohn's disease of 1.0 cases/ $10^5$ /year (Kyle et al, 1980 and Harries et al, 1982). In addition, many other patients with inflammatory bowel disease have been referred to sigmoidoscopy/proctoscopy service who were not referred back to the gastro-enterology clinic. It is presumed that they were mild cases and were managed satisfactorily by their general practitioner.

In another series, the distribution of rectal carcinomas staged by Duke's classification was compared with published series (Talbot et al, 1980). The figures were broadly similar, 49 percent of tumours in both series being stage C. Stage A, however, was diagnosed more commonly in the present series, 27 percent as compared with 13 percent. It had been observed that offering a rapid open access service of this type has not resulted in more clear evidence for detection rectal carcinoma at an early stage. An alternative approach has been the widespread use of occult blood testing. In patients with symptoms a yield for carcinoma of 4.6 per

cent has been reported (Leicester et al, 1983). Unfortunately, that approach still resulted in detection of only 11 percent of malignant tumours in Duke's stage A and a false negative rate for rectal carcinoma of 45.4 percent (Leicester et al, 1983). Screening for presymptomatic disease by occult blood testing has been shown to increase the proportion of stage A tumours diagnosed to 75 percent (Hardcastle et al, 1983). Hence possibly a combination of sigmoidoscopy and occult blood testing will produce the best early detection rate for colorectal carcinoma.

The frequency with which the rigid sigmoidoscope should be used to examine beyond the rectosigmoid junction in this series (33 percent, 478 cases) was similar to that reported by others (Bohlman et al, 1977 and Marks et al, 1979). Probably this could be increased to about 70 percent with the use of a routine barium enema before examination but this would place extra demands on nursing staff and cause needless discomfort to some patients. There are advantages to the use of rigid sigmoidoscopy particularly at first examination. It is far quicker, can usually be carried out without bowel preparation and much larger biopsy specimens can be obtained. Inspection of the bowel



stool without prior bowel preparation can also be of considerable value in that it may show blood streaking indicating a source of bleeding from a higher level, or have the typical appearances associated with steatorrhoea or irritable bowel syndromes.

It has been emphasized that roughly half of all colorectal carcinomas are found within the reach of the rigid sigmoidoscope (Leffal, 1974 and Rosato, 1981). A further quarter occur below the mid descending colon and may therefore be detected by fibroptic sigmoidoscopy (Meyer et al, 1979).

In a study, Elliott and co-workers (1982) found that in a small number of cases, barium enema examination fails to detect minor mucosal abnormalities of colitis. They reported on 8 patients with inflammatory bowel disease of colon diagnosed during sigmoidoscopy in whom barium findings were normal. The findings in 10 patients with minimal mucosal changes shown on barium enema examination and in 10 asymptomatic patients with normal barium enema findings also were reviewed. All study patients had symptoms suggestive of colonic disease, although these symptoms usually were slight. All had

normal rectal mucosal appearance at sigmoidoscopy, although a rectal biopsy specimen showed histologic changes of inflammatory bowel disease in 7 cases. Results of laboratory studies often were abnormal. Infective aetiologies were ruled out. Sigmoidoscopic studies showed minor mucosal inflammation in 7 cases and large discrete superficial ulcers in 1 case. Three observers made a correct diagnosis in all control cases of minimal colitis. In the normal control group, 1 set of radiographs was incorrectly labelled by 2 observers. All radiographs from study patients were reported by at least 1 observer to be normal and in 4 cases all observers reported normal findings. All radiographs from study patients were considered technically satisfactory. The rectum appears normal when seen at sigmoidoscopy in about 5 percent with ulcerative colitis and 50 percent of those with ~~C~~ahn's colitis. Some patients have normal barium enema findings despite the presence of mild but extensive colitis sufficient to cause illness. The findings emphasize the needs to perform a rectal biopsy in patients with gastrointestinal symptoms of unknown origin. If the rectal biopsy specimen

or laboratory findings are abnormal, sigmoidoscopy is necessary even if the result of high quality barium enema study are normal.

Another study conducted by Vellacott (1982) on "One hundred consecutive new patients" attending a general surgical and gastro-intestinal out patient clinic had a sigmoidoscopic examination before barium enema. Colonic lesions were found in 45 patients and sigmoidoscopy was superior to barium enema in diagnosing lesions in the sigmoid colon. Two cancers, 1 histologically a Dukes' A lesion and 6 adenomatous polyps greater than 0.5 cms in diameter, in the sigmoid colon, were not detected by barium enemas. In 6 of these patients extensive diverticular disease was present. In patient with rectal bleeding found to have diverticular disease demonstrated radiographically, an endoscopic examination must be performed to exclude polyps or cancer sigmoidoscopy may reduce the numbers needing barium enema.

The standard 25 cms rigid sigmoidoscope has been used in the evaluation of colorectal disease for decades (Browne, 1948). In spite of its unquestioned value

in the evaluation of patients with colonic problems, serious limitations in its diagnostic usefulness remain. The major deficiency of this instrument is that the average sigmoidoscopist inspects primarily the distal 15-18 cms of colon (Madigan and Co-workers, 1968). Diverticular disease, strictures, localised inflammatory bowel disease, polyps and colon cancer often occur more proximally in the colon just beyond the reach of the rigid instrument. Previous studies indicated that perhaps 70 percent of colon neoplasms were located in the distal 25 cms of bowel and should be seen by this instrument (Bolt, 1971). Recent data, however, suggest a major change in distribution, with a greater number of lesions above the level of rectosigmoid (Salmon, 1971; Koyana, 1974; Rubin, 1975; Berg, 1974; Smith and colleagues, 1976). Thus the potential of finding colon cancer by rigid sigmoidoscopy alone may be diminishing. Additional problems with rigid sigmoidoscopy include unavoidable discomfort and difficulties intraversing the redundant lower sigmoid segment. These problems may lead the sigmoidoscopist to abandon the procedure before a thorough examination is accomplished.

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AIMS OF THE STUDY

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AIMS AND OBJECTS

1. To evaluate the prevalence of lower gastrointestinal diseases in Bundelkhand region of India.
2. To assess the diagnostic efficacy of sigmoidoscopy as a first line procedure.
3. To evaluate the competitive and complementary features of sigmoidoscopy and barium enema.



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## MATERIAL AND METHODS

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## M A T E R I A L   A N D   M E T H O D

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The present study was conducted on the patients attending the Medical and Surgical Out Patient Department or admitted in the respective wards of Maharani Laxmi Bai Medical College, Hospital, Jhansi having symptoms suggestive of diseases of colon and rectum. The study was conducted during the period from October, 1989 to September, 1990. All the cases were followed up for a minimum period of three months for any further complication/out come of therapy.

A detailed and relevant history was taken, clinical examination and investigations including total leucocytes count, differential leucocytes count, Erythrocyte sedimentation rate, Haemoglobin, Stool examination, rectum and colon biopsy etc. were carried out.

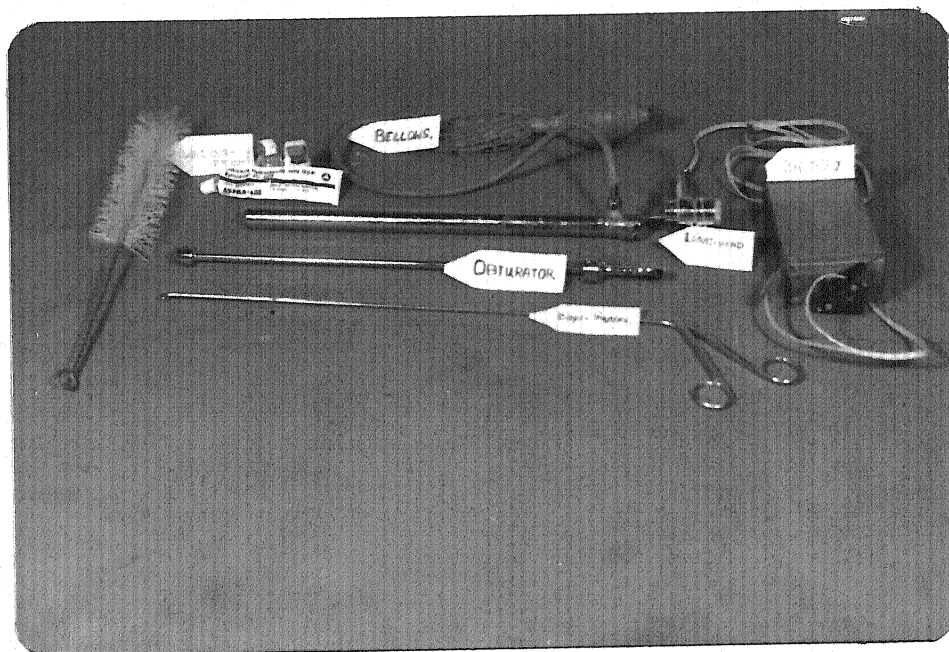
Barium enema was done after sigmoidoscopy in all cases having symptoms suggestive of surgical disease and in patients who showed evidence of cancer or polyp on sigmoidoscopy. Barium enema was also done in cases of ulcerative colitis found on sigmoidoscopic examination to know the extent of the disease. In the cases,

where biopsy was taken barium enema was deferred for ten days to avoid colonic perforation (Nicholls, 1977).

Sigmoidoscopy was performed without bowel preparation with laxative or by wash outs. Indeed, it is very desirable that the inspection should be carried out without any preparation. Purgation may make the examination impossible by filling the rectum with liquid faeces (Jones, Gummer Jones, 1963). Lavage may wash away a tell tale fleck of blood or mucus which may be the only evidence of disease higher up in the bowel and it causes a general hyperaemia so that the normal vascular pattern cannot be seen. Some times it was not possible to get a complete view on the first occasion; in these cases the examination was repeated after defaecation (Avery Jones et al, 1968).

The following equipments were used and were conveniently kept on a trolly in the examination room:

1. A couch.
2. Small sand bag.
3. Rubber sheet/or paper to cover bed cloths.
4. Disposable rubber gloves.



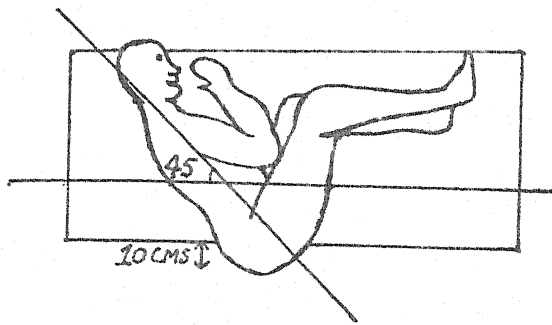
Rigid Sigmoidoscope, with bellows and obturator.

5. Rigid sigmoidoscope (with obturator, bellows, eye piece, light fitting).
6. Battery or transformer.
7. Biopsy forceps.
8. Lubricant (Lidocaine hydrochloride jelly 2%).
9. Formalin pot for biopsies (Formalin - 10%).
10. Different specimen vials for collection of stool and/or bacteriological swab.
11. Washing brush for cleaning the inside of the sigmoidoscope.

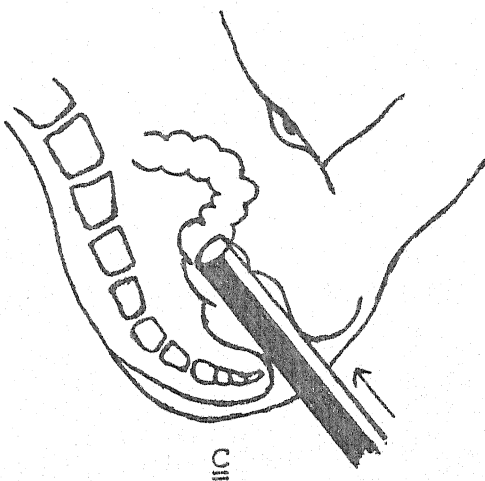
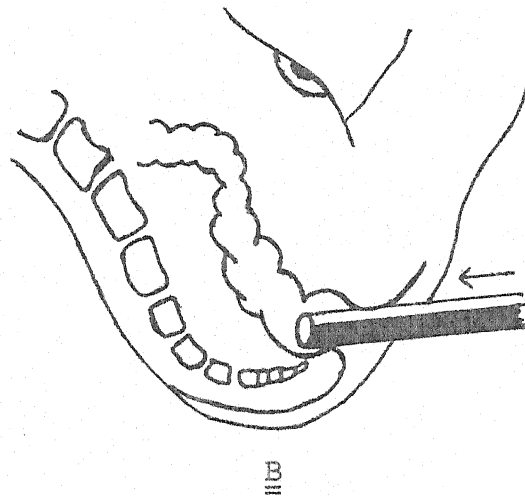
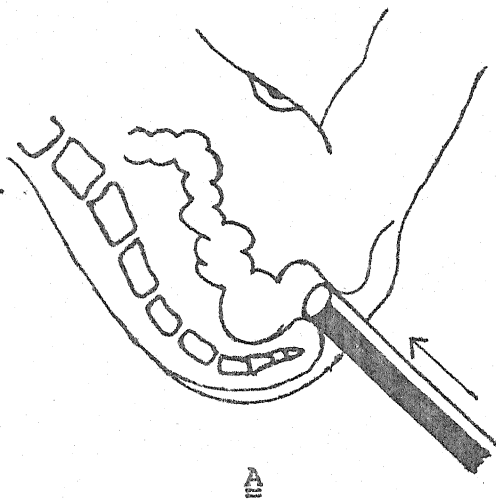
#### TYPE OF INSTRUMENT

Rigid sigmoidoscope (Lloyd Davies type) having diameter 1.5 cms, length 25 cms was used. With this small bore instrument, discomfort to the patient was minimal and examination to 25 cms was possible without difficulty in most cases.

In selected cases the still smaller instrument (diameter 2.5 cm, length 20 cm) or larger instrument (diameter 2.5 cm, length 30 cms) was used.



Position for Sigmoidoscopy; plain view of patient on examination couch, with buttocks projecting 10 cms beyond the edge on the examiner's side.



Sigmoidoscopy : The sequence of angles through which the instrument is advanced under direct vision and with the help of air insufflation.



### POSITION OF PATIENT

The left lateral position (Sim's position) was carried out during sigmoidoscopy. The four essential features of left lateral position are :

1. Long axis of patient's trunk at  $45^{\circ}$  to long axis of couch.
2. Feet level with far edge of the couch.
3. Buttocks raised on sand bag/pillow/or folded towels.
4. Buttocks extending about 10 cms beyond the <sup>edge</sup> near <sub>^</sub> of the couch.

Other positions are :

1. Jack knife position (prone position).
2. Knee - chest position.

But these positions are less comfortable and may require special tables.

Sigmoidoscopy under anaesthesia is less safe than when patient is conscious and can cooperate. The order of examination was (i) inspection (ii) palpation and (iii) sigmoidoscopy. Prior to performing the procedure the indication and the purpose was explained.



Accordingly, the length of instrument was chosen. Also, a digital examination of the rectum/and anal canal were necessary prerequisites to ensure that there were no lesions in the anus or the rectum which may interfere with the sigmoidoscopic examination or get traumatised during the procedure.

#### PASSAGE OF THE INSTRUMENT

- Patient kept in left lateral position as mentioned above.
- The instrument was lubricated with 2 percent lidocaine - Hydrochloride jelly (2%) and passed gently into the anal canal towards the patient's umbilicus. A fall of resistance indicates that tip has entered the rectum.
- The obturator was removed and the eye piece, light and bellows were attached.
- The examination was always carried out under direct vision without blind advancement with just sufficient air insufflated to keep the rectal walls apart.
- The instrument was angled backwards along the sacral

curve, past the valves of Houston until the recto sigmoid junction at about 15 cms from the anal verge is reached. It was then advanced anteriorly and to the left into the sigmoid colon. Passage through the rectosigmoid junction may cause discomfort and force must never be used.

- The instrument was withdrawn slowly, inspecting all parts of the bowel mucosa and taking care to examine behind folds where lesions such as polyps may be hidden.

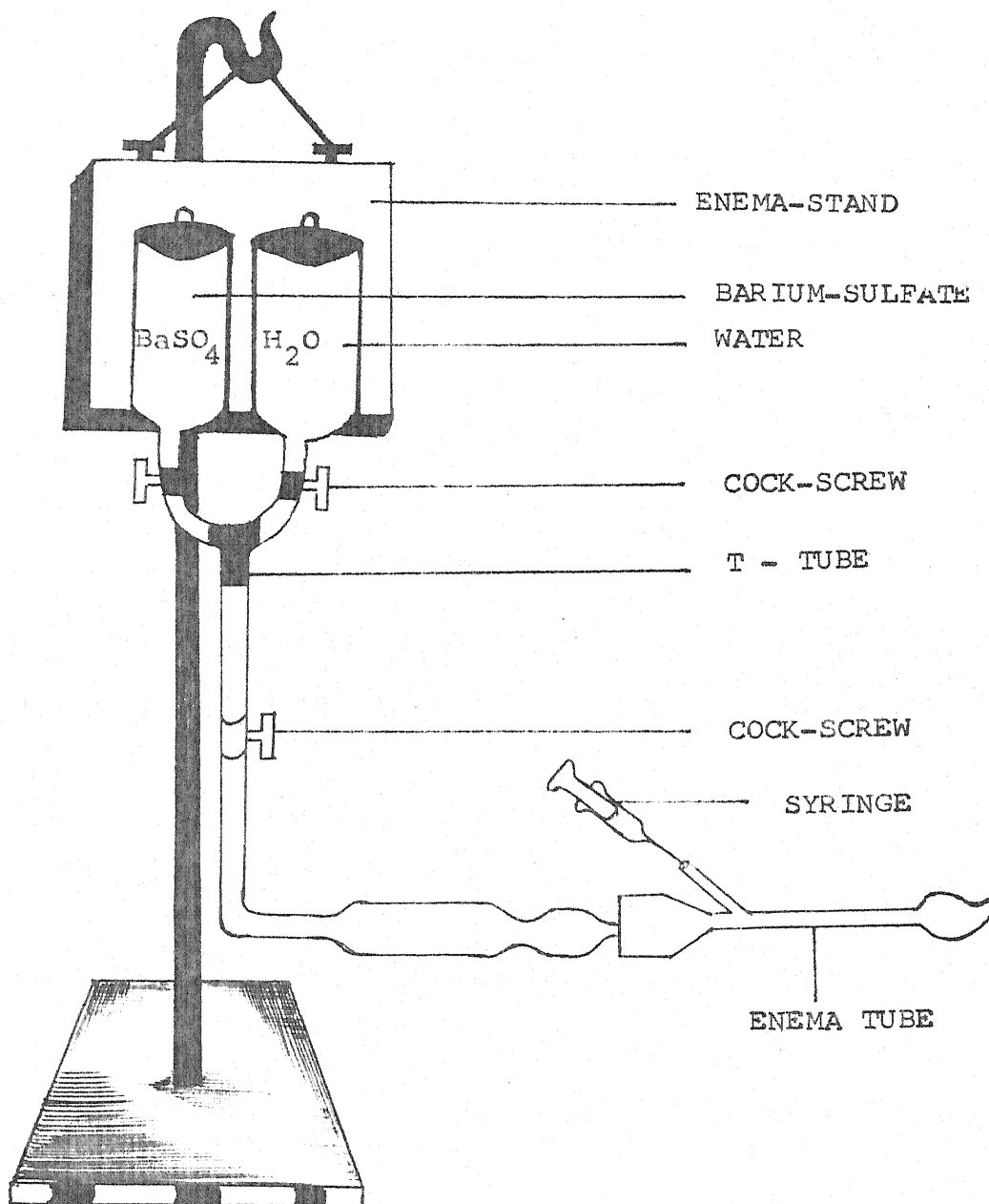
The normal mucous membrane is pale pink with visible submucosal vessels (vascular pattern). Friability of mucus-folds was estimated by gentle pressure with the sigmoidoscope. The following things were looked for ; abnormal faeces, blood, pus, mucous, worms in the lumen, focal mucosal lesions (like polyp, carcinoma, ulcer) and diffuse lesion (like inflammation).

- Before the sigmoidoscope was withdrawn from the rectum the observation glass was removed to allow air to escape.

- The total distance, the sigmoidoscope had been passed was recorded as well as the distance of any abnormality from the anal verge, its site and extent, both proximal and circumferential was also recorded.
- If biopsy was taken, it was taken after removal of observation glass, using large cusp forceps (Patterson's type). Biopsy site was properly inspected for evidences of bleeding.

#### LIMITATION OF THE SIGMOIDOSCOPY

The limitation of sigmoidoscopy regardless of age, concern the restricted extent of direct visualisation. The rectum is 12.5 cm, the sigmoid varies in length and position. In a complete examination in a non redundant sigmoid the most that can be seen, is 25-30 cm (10 inches to 12 inches) from the Anus i.e. the rectum, rectosigmoid junction and lower sigmoid. In a redundant sigmoid, the instrument is threaded into loops, so that as much as 40 cms may be inspected with 25 cms (10 inches) sigmoidoscope fully inserted. Incomplete passage of the entire length of sigmoidoscope, a rigid instrument, occur in 15 percent of cases.



BARIUM ENEMA APPARATUS

SINGLE CONTRAST (STANDARD) BARIUM ENEMA  
PREPARATION OF PATIENT

Antiflatulent was given for 2 days prior to barium enema. Laxative was given at night on second day.

Patient was adequately instructed and procedure explained.

APPARATUS AND INSTRUMENTS

- a. Barium enema apparatus.
- b. Barium enema stand.
- c. Instrument tray.
- d. Enema tube.
- e. Enamel - bucket.

CHEMICAL AND DRUGS

1. Barium sulphate suspension (50 percent water/volume).
2. Lignocaine jelly - 2%.
3. Sprit.
4. Savlon (Cetrimide 7.5% + chlorhexidine 15%).

BARIUM ENEMA APPARATUS

The apparatus was made with necessary modification as described by - "Pachaczewsky (1975)". It

is a closed system consisting of two enema cans and "Y" shaped adaptor connects the twin containers to the enema tube, provided with separate stop-cocks. The distal end of the rubber tubing was connected with enema tube. One of the twin containers contain 300 ml of barium suspension and the other contains 200 ml of Luke warm water.

#### THE PROCEDURE

Taking into consideration, the general condition of the patient, a single contrast barium enema was carried out under fluoroscopic control as regulation of flow of barium could be observed.

The tip of enema tube is lubricated with lido-cain-Hydrochloride jelly (2%) and introduced into the rectum of the patient lying in left lateral position. The balloon of enema tube is inflated with plain water to a maximum capacity of 20-30 ml.

#### THE TECHNIQUE

Barium enema suspension is introduced by gravity technique by the above apparatus from a height



not exceeding 2 to 3 feet above fluoroscopic table. Initially barium mixture is allowed to flow slowly in order to avoid over distension of rectum which may precipitate defaecation. The flow of mixture is observed through fluoroscopy from the moment it enters the rectum and its progression observed from time to time. Rotation of the patient is done to bring various bowel loops into profile. The flow of mixture is stopped, once it reaches the transverse colon and water is introduced through the second container. The column of barium is seen as it heads the water column to reach the caecum and reflux into terminal ileum is observed.

Refluxing barium into the terminal ileum assure that entire colon is filled. Spot films were taken wherever indicated along the passage of barium through the entire colon.

Once the examination was completed, barium was evacuated from the large bowel by siphoning technique, on the table itself into a bucket.

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OBSERVATIONS

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O B S E R V A T I O N S

The present study was conducted at Maharani Laxmi Bai Medical College, and Hospital, Jhansi in the department of Medicine and Radiology during the period of October, 1989 to September, 1990. The study groups consisted of 54 symptomatic cases of various types of lower gastrointestinal diseases viz. Amoebic colitis, ulcerative colitis, worms infestation, bacillary dysentery, irritable bowel syndrome, sigmoid-diverticulae and colonic malignancy. The number of cases of amoebic colitis were 12(22.22%), Amoebic colitis with thread worms infestation 8(14.82%), Ulcerative colitis 4(7.41%),

**TABLE I :** Distribution of cases of various lower gastrointestinal diseases.

Sl. No.	Groups	No. of cases	Percentage
1.	No lesions	12	22.22
2.	Amoebic colitis	12	22.22
3.	Amoebic colitis with thread worms infestation	8	14.82
4.	Ulcerative colitis	4	7.41
5.	Pseudomembranous colitis	2	3.70
6.	Irritable bowel syndrome	6	11.11
7.	Colonic malignancy	4	7.41
8.	Bacillary dysentery with thread worms infestation	4	7.41
9.	Sigmoid diverticulae	2	3.70
Total		54	100.00

Pseudomembranous colitis 2(3.70%), irritable bowel syndrome 6(11.11%), colonic malignancy 4(7.41%), bacillary dysentery with thread worms infestation 4(7.41%), and sigmoid diverticulae 2(3.70%). Twelve symptomatic cases (22.22%) were found to have normal sigmoidoscopy (Table I).

Table II shows the age and sex distribution of different subgroups of subjects. Out of 54 cases, there were 42 males and 12 females. The majority of male cases (28.58%) were in the age group of 21-30 years with the mean age of 25.50 years. The majority of female cases were in the age group of 11-40 years with the mean age of 25.50 years (Table II).

TABLE II : Age and sex distribution of different subgroups of subjects.

Age groups (years)	Males		Females		Total	
	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage
11-20	10	23.80	4	33.33	14	25.93
21-30	12	28.58	4	33.33	16	29.63
31-40	6	14.29	4	33.33	10	18.52
41-50	4	9.52	-	-	4	7.40
51-60	6	14.29	-	-	6	11.12
61-70	4	9.52	-	-	4	7.40
TOTAL	42	100.00	12	100.00	54	100.00

The age and sex distribution of study groups are shown in table III and table IV. Out of 12 normal sigmoidoscopies, 8(14.81%) were males and 4(7.40%) were

females. There were 12 cases of amoebic colitis, all (22.22%) were found in males with majority of cases in the age group of 21-30 years. There were 8 cases of amoebic colitis with thread worms infestation, 6(11.11%) were males and 2(3.70%) were females, the majority of cases were in the age group of 11-20 years. There were 4 (7.40%) cases of ulcerative colitis, all were males in the age groups of 21-30 and 41-50 years. There were two (3.70%) cases of pseudomembranous colitis; all were females in the group of 11-20 years. There were 6 cases of irritable bowel syndrome, 4(7.40%) males and 2(3.70%) females, the majority of these cases were in the age group of 21-30 years. There were 4 cases of colonic malignancy, all (7.40%) were males in the age group of 61-70 years. There were 2(3.70%) cases of bacillary dysentery with thread worms infestations in males and in same number(3.70%) in females, out of 4 cases of bacillary dysentery with thread worms infestation. Sigmoid diverticulae were present in 2 cases. All (3.70%) were in the males in the maximum age group of 51-60 years(Table III and IV).

Contd....

TABLE III : Showing the sex distribution in different lower gastrointestinal diseases.

Groups	Males		females		Total
	No.	%	No.	%	
No lesions	8	14.81	4	7.40	12
Amoebic colitis	12	22.22	-	-	12
Amoebic colitis with thread worms infestation	6	11.11	2	3.70	8
Ulcerative colitis	4	7.40	-	-	4
Pseudomembranous colitis	-	-	2	3.70	2
Irritable bowel syndrome	4	7.40	2	3.70	6
Colonic malignancy	4	7.40	-	-	4
Bacillary dysentery with thread worms infestation	2	3.70	2	3.70	4
Sigmoid diverticulæ	2	3.70	-	-	2
Total	42	78.74	12	22.20	54

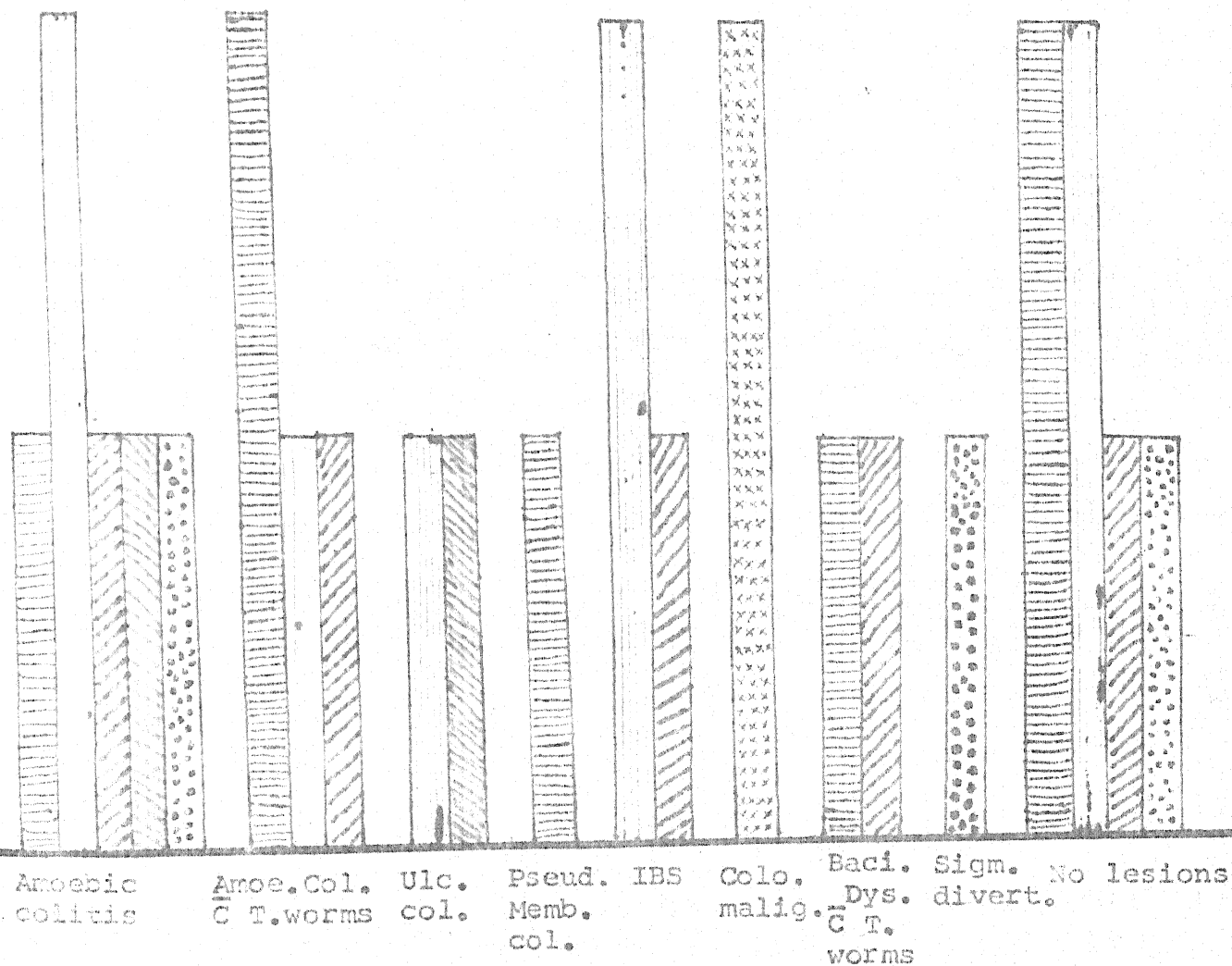
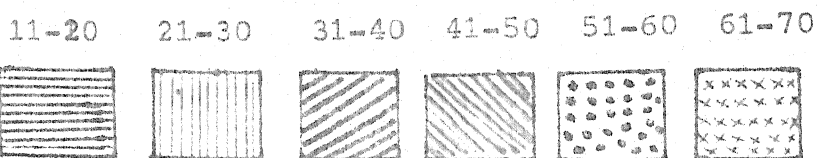
TABLE IV : Showing age distribution in different study groups.

Study groups	Age groups (years)						Total
	11-20	21-30	31-40	41-50	51-60	61-70	
Amoebic colitis	2	4	2	2	2	-	12
Amoebic colitis with thread worms	4	2	2	-	-	-	8
Ulcerative colitis	-	2	-	2	-	-	4
Pseudomembranous colitis	2	-	-	-	-	-	2
Irritable bowel syndrome	-	4	2	-	-	-	6
Colonic malignancy	-	-	-	-	-	4	4
Bacillary dysentery with thread worms infestation	2	-	2	-	-	-	4
Sigmoid diverticulæ	-	-	-	-	2	-	2
No lesions	4	4	2	-	2	-	12
Total	14	16	10	4	6	4	54



Bar Diagram showing age distribution of study groups.

of cases.



STUDY GROUPS

TABLE V : Intubation distance reached by sigmoido scope.

Sl. No.	Distance from anal verge (cm)	No. of cases (54)	Percentage	Cumulative percentage
1.	≤ 15	4	7.4	7.4
2.	Upto 20	8	14.8	22.2
3.	Upto 25	24	44.4	66.6
4.	Upto 30	18	33.4	100.0

Intubation data (table V) shows that rigid scope was passed upto 25 cms in most of the cases (44.4%) and upto 20 cms in 14.8% cases and upto 30 cms in 33.4% cases. 7.4% of the examinations were terminated at levels below or upto 15 cms, which represents a partially selected group and were subjected for barium enema examination for this very reason. In 2(3.7%) cases of this 7.4% of examination, sigmoidoscope could pass upto 10 cms due to presence of malignant growth and in rest 2(3.7%) cases, scope could pass upto 15 cms only due to presence of malignant stricture or growth.

Table VI shows that all the diseases except ulcerative colitis and sigmoid diverticulæ, presented within six months duration, while ulcerative colitis and sigmoid diverticulæ presented with a duration of one year or more.

TABLE VI : Duration of presenting symptoms in different study groups.

Study groups	Duration					
	1-7 days No. (%)	1Wk-1 month No. (%)	1-3 months No. (%)	3-6 months No. (%)	6-12 months No. (%)	12+ months No. (%)
No lesions	2 (16.6)	2 (16.6)	2 (16.6)	2 (16.6)	-	4 (33.4)
Amoebic colitis	2 (16.6)	4 (33.4)	4 (33.4)	-	-	2 (16.6)
Amoebic colitis with thread worm infestation	-	4 (50.0)	-	-	2 (25.0)	2 (25.0)
Ulcerative colitis	-	-	2 (50.0)	-	-	2 (50.0)
Pseudomembranous colitis	-	2 (100.0)	-	-	-	-
Irritable bowel syndrome	-	2 (33.3)	-	4 (66.67)	-	-
Colonic malignancy	-	2 (50.0)	-	2 (50.0)	-	-
Bacillary dysentery with thread worms infestation	2 (50.0)	2 (50.0)	-	-	-	-
Sigmoid diverticulae	-	-	-	-	-	2 (100.0)

Table VII shows breakup of symptoms in different diseases, viz. out of 12 cases of amoebic colitis, loose stools was present in 10 cases, pain in abdomen in 10 cases and weight loss was present in 4 cases, but bleeding per rectum was not present in any of these cases of amoebic colitis. Similarly in other diseases also, break up of different symptoms are shown in table VII.

TABLE VII : Showing details of diseases and breakup of symptoms.

Diseases	Symptoms			
	Loose stools	Pain in abdomen	Bleeding per rectum	Weight loss
	No. (%)	No. (%)	No. (%)	No. (%)
Amoebic colitis (n=12)	10 (22.73)	10 (33.33)	-	4 (20%)
Amoebic bolitis with thread worms infestation (n=8)	8 (18.18)	2 (6.67)	-	2 (10)
Bacillary dysentery with thread worms infestations (n=4)	4 (9.09)	-	-	-
Ulcertative colitis (n=4)	4 (9.09)	4 (13.33)	-	4 (20)
Irritable bowel syndrome (n=6)	6 (13.64)	4 (13.33%)	-	4 (20)
Colonic malignancy (n=4)	-	-	4 (100)	4 (20)
Sigmoid diverticulae (n=2)	-	2 (6.67)	-	-
Pseudomembranous colitis (n=2)	2 (4.54)	-	-	-
No lesion (n=12)	10 (22.73)	8 (26.67)	-	2 (10)
TOTAL	44 (100.0)	30 (100.0)	4 (100.0)	20 (100.0)

SIGMOIDOSCOPY IN RELATION TO VARIOUS SYMPTOMS  
OF LOWER GASTROINTESTINAL DISEASES

Table VIII shows the sigmoidoscopy in relation to pain in abdomen cases. Out of 30 cases in which pain in abdomen was present, 22 (73.33%) cases had shown positive findings in sigmoidoscopy. Similarly out of 24 cases in

which pain in abdomen was ~~absent~~, 20(83.33%) cases had positive findings at sigmoidoscopy (Table VIII). This difference was statistically insignificant ( $\chi^2 = 0.767$ , d.f. = 1,  $p > 0.1$ ).

TABLE VIII : Sigmoidoscopy in relation to pain in abdomen.

Pain in abdomen	Sigmoidoscopy				p value
	Positive		Negative		
	No.	Perce- ntage	No.	Perce- ntage	
Present (n=30)	22	73.33	8	26.67	70.1
Absent (n=24)	20	83.33	4	16.67	

TABLE IX : Sigmoidoscopy in relation to loose stool.

TABLE IX : Sigmoidoscopy in patients					
Loose stools	Sigmoidoscopic				p value
	Positive		Negative		
	No.	Percentage	No.	Percentage	
Present (n=44)	39	88.64	5	11.36	<0.05
Absent (n=10)	6	60.00	4	40.00	

Table IX shows the sigmoidoscopy in relation to loose stools, out of 44 cases in which loose stools was present, 39(88.64%) cases had shown the positive findings on sigmoidoscopy, on the other hand 5(11.36%) cases of loose stools were sigmoidoscopically negative. Similarly total 10 cases in which loose stools was not present, 6(60%) cases were sigmoidoscopically positive and 4(40%) cases were sigmoidoscopically negative, this difference was statistically significant ( $\chi^2 = 4.89$ , d.f.=1,  $p < 0.05$ ).



TABLE X : Sigmoidoscopy in relation to weight loss.

Weight loss	Sigmoidoscopy				p value
	Positive		Negative		
	No.	Percentage	No.	Percentage	
Present (n=20)	16	80.00	4	20.00	70.5
Absent (n=34)	26	76.47	8	23.53	

Table X shows the sigmoidoscopy in relation to weight loss. Out of 20 cases of weight loss 16(80%) were sigmoidoscopically positive and in 34 cases in which weight loss was absent, 26(76.47%) cases were sigmoidoscopically positive and 8(23.53%) cases were sigmoidoscopically negative. This difference was statistically insignificant ( $\chi^2 = 0.087$ , d.f.=1, p 70.5).

TABLE XI : Sigmoidoscopy in relation to bleeding per rectum.

Bleeding per rectum	Sigmoidoscopy				p value
	Positive		Negative		
	No.	Perce- ntage	No.	Perce- ntage	
Present (n=4)	4	100.00	-	-	/0.05
Absent (n=50)	38	76.00	12	24.00	

Table XI shows sigmoidoscopy in relation to bleeding per rectum. All the 4(100%) cases who were presented with frank bleeding per rectum were sigmoidoscopically positive, and 50 cases, in which there was no bleeding per rectum, 38(76%) cases were sigmoidoscopically positive and 12(24%) cases were sigmoidoscopically negative, this difference was statistically significant ( $\chi^2 = 2.78$ , d.f. = 1, p 0.05).

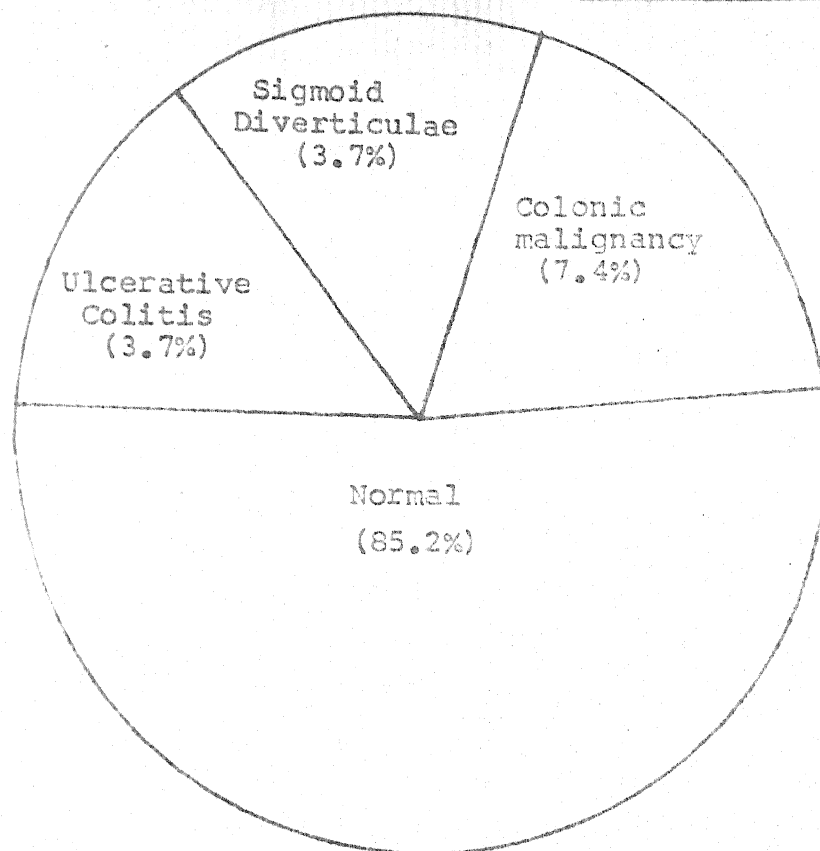


TABLE XII : Total diagnostic yield by sigmoidoscopy and barium enema.

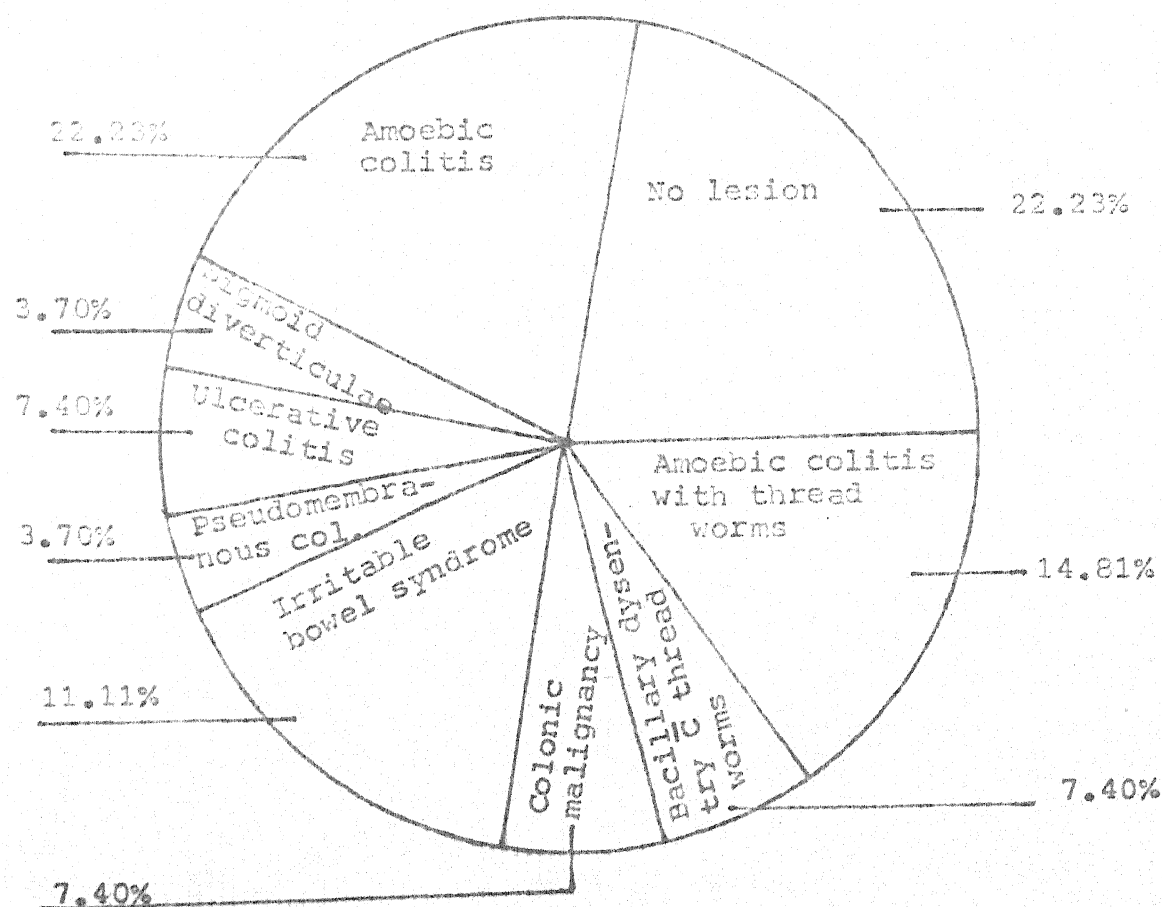
Sl. No.	Diagnosis	Total cases	Detected by			
			Sigmoidoscopy		Barium enema	
			No.	%	No.	%
1.	Amoebic colitis	12	12	100.00	-	-
2.	Amoebic colitis with thread worm infestation.	8	8	100.00	-	-
3.	Ulcerative colitis	4	4	100.00	2	50.00
4.	No lesions	12	-	-	-	-
5.	Irritable bowel syndrome	6	6	100.00	-	-
6.	Bacillary dysentery with thread worms infestation.	4	4	100.00	-	-
7.	Sigmoid diverticulae	2	2	100.00	2	100.00
8.	Pseudomembranous colitis.	2	2	100.00	-	-
9.	Colonic malignancy	4	4	100.00	4	100.00
Total		54	42/54 = (77.80%)		8/54 = (14.8%)	

Total diagnostic yield of lower gastrointestinal diseases using sigmoidoscopy and barium enema is shown in table XII. Barium enema examination failed to detect 2 cases of ulcerative colitis. The 12 cases of amoebic colitis, 8 cases of amoebic colitis, 4 cases of bacillary dysentery, and 2 cases of pseudomembranous colitis were also not diagnosed on barium enema and were not considered as, failure of technique. The 12 cases which did not show any findings on sigmoidoscopy, also found normal on barium enema.

A - Pie Diagram showing Barium Enema positivity in different colorectal diseases.

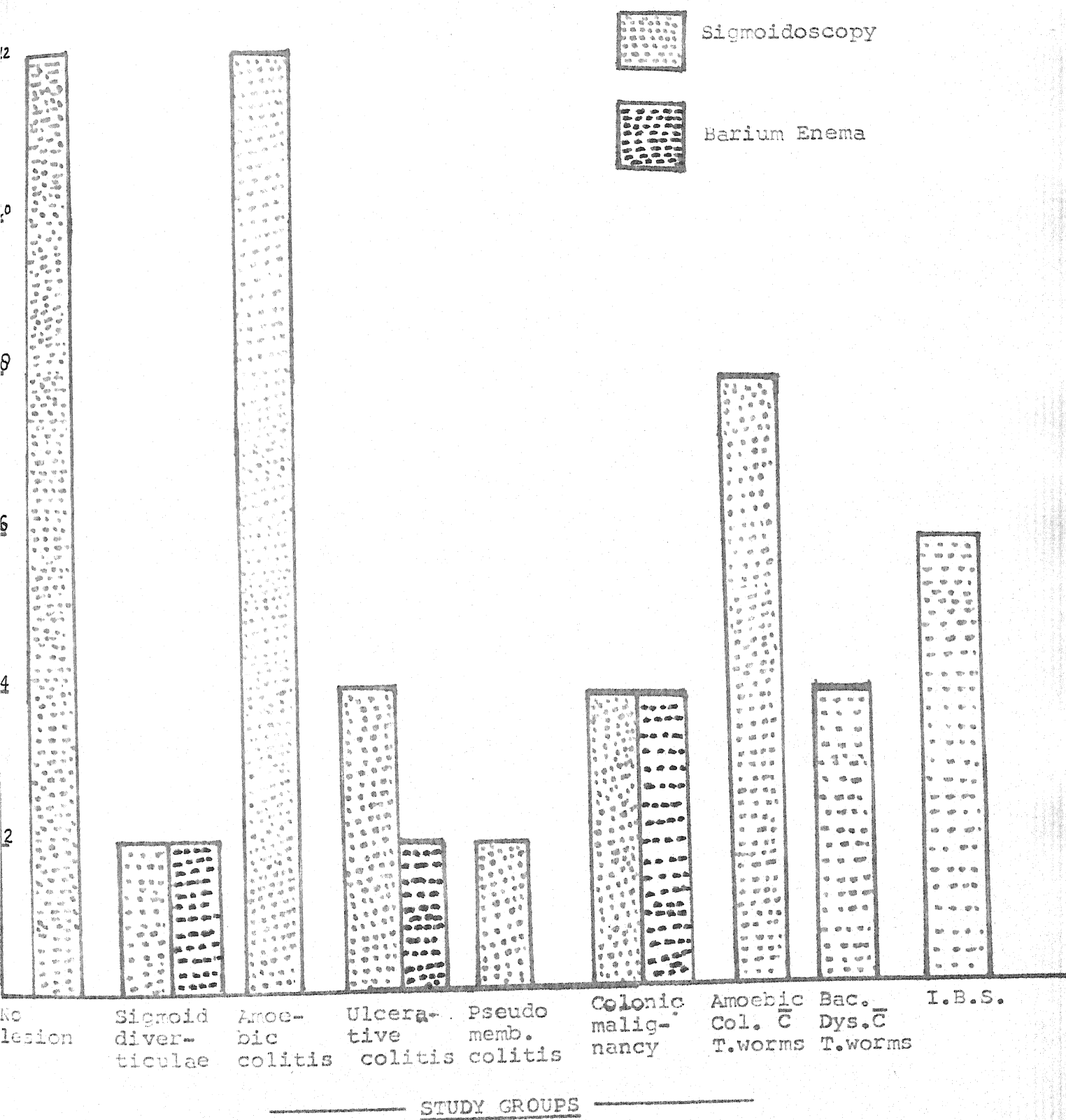


B - Pie Diagram showing Sigmoidoscopic distribution of different colorectal diseases.



of cases

Component Bar diagram showing Sigmoidoscopy and Barium Enema positivity in different study groups



BARIUM ENEMA IN RELATION TO VARIOUS SYMPTOMS OF  
LOWER GASTROINTESTINAL SYMPTOMS

TABLE XIII : Barium enema in relation to pain in abdomen.

Pain in abdomen	Barium enema				p value
	Positive cases		Negative cases		
	No.	%	No.	%	
Present (n=30)	2	6.67	28	93.33	70.5
Absent (n=24)	2	8.33	22	91.67	

Table XIII showing barium enema in relation to pain in abdomen. Out of 30 cases in which pain in abdomen was present, 2(6.67%) cases were positive on barium enema and 28(93.33%) cases were negative on barium enema. Similarly 24 cases, in which pain abdomen was absent, 2(8.33%) cases were positive on barium enema and 22(91.67%) cases were negative on barium enema. This difference was statistically insignificant ( $\chi^2=0.53$ , d.f.=1, p 70.5).

TABLE XIV : Barium enema in relation to loose stools.

Loose stools	Barium enema				p value
	Positive cases		Negative cases		
	No.	%	No.	%	
Present (n=44)	1	2.27	43	97.73	70.05
Absent (n=10)	2	20.00	8	80.00	

Table XIV showing barium enema in relation to loose stools. Out of 44 cases in which loose stools was presenting symptoms, 1(2.27%) case was positive on barium enema and 43 (97.73%) cases were negative on barium enema. Similarly 10 cases in which loose stools was not present,

2(20%) cases were positive on barium enema and 8(80%) cases were negative on barium enema. This difference is statistically insignificant ( $\chi^2=3.37$ , d.f.=1,  $p > 0.05$ ).

TABLE XV : Barium enema in relation to weight loss.

Weight loss	Barium enema				p value
	Positive cases		Negative cases		
	No.	%	No.	%	
Present (n=20)	2	10.00	18	90.00	7 0.5
Absent (n=34)	1	2.94	33	97.06	

Table XV showing barium enema in relation to weight loss. Out of 20 cases in which weight loss was present, 2(10%) cases were positive on barium enema and 18(90%) cases were negative on barium enema. Similarly 34 cases, in which weight loss was not present, 1(2.94%) case was positive on barium enema and 33(97.06%) cases were negative on barium enema. This test is statistically insignificant ( $\chi^2=0.88$ , d.f.=1,  $p > 0.5$ ).

TABLE XVI : Barium enema in relation to bleeding per rectum.

Bleeding per rectum	Barium enema				p value
	Positive cases		Negative cases		
	No.	%	No.	%	
Present (n=4)	4	100.00	-	-	/0.001
Absent (n=50)	4	8.00	46	92.00	

Table XVI shows barium enema in relation to bleeding per rectum. Out of 4(100%) cases who presented with frank bleeding per rectum was subjected to barium



enema examination and all were came out positive on barium enema, and out of 50 cases in whom bleeding per rectum was not present, 4 cases (8%) were barium enema positive and 46(92%) cases were barium enema negative. This difference was statistically significant ( $\chi^2=33.28$ , d.f.= 1, p  $\leq 0.001$ ).

TABLE XVII : Different screening categories and their relation with different study groups.

Study groups	Screening category (positive)			
	Stools test	Sigmoidoscopy	Barium enema	Colonic biopsy
Amoebic colitis(n=12)	4 (33.3%)	12 (100.0%)	-	-
Amoebic colitis with thread worms (n=8)	6 (75.0%)	8 (100%)	-	4 (50%)
Bacillary dysentery with thread worms (n=4)	3 (75.0%)	4 (100%)	-	-
Pseudomembranous colitis (n=2)	-	2	-	-
Sigmoid diverticulae (n=2)	-	2	2 (100%)	-
Irritable bowel syndrome (n=6)	-	6	-	-
Colonic malignancy (n=4)	4 (100%)	4	4 (100%)	4 (100%)
Ulcerative colitis (n=4)	3 (75%)	4	2 (50%)	4 (100%)
No lesions (n=12)	-	-	-	-

Table XVII shows different screening categories and their relation with different study groups. The 12 cases which were detected normal on sigmoidoscopy,



also found negative in different screening categories, (stool, biopsy and barium enema examination). The 12 cases, which were detected as cases of amoebic colitis on sigmoidoscopy, could remain positive only in 4 (33.3%) cases on stool examination while on biopsy and barium enema these were found negative. The 8 cases of amoebic colitis with thread worm infestation which were diagnosed on sigmoidoscopy, could only be positive in 6 (75%) cases on stool examination while these cases were found positive in 4 cases on biopsy, but remained negative in all cases on barium enema examination. The 4 cases of bacillary dysentery with threadworms infestation which were diagnosed on sigmoidoscopy, could only be positive in 3 (75%) cases on stool and bacteriological examination while on rest of the screening categories, these were found negative. The 2 cases of pseudomembranous colitis remained negative on all the screening categories except on sigmoidoscopy, similarly 2 cases of sigmoid diverticulae which detected on sigmoidoscopy were also remained positive in all the 2 (100%) cases on barium enema while on rest of the screening categories, they were found negative. Irritable bowel syndrome (6 cases) could only be diagnosed on sigmoidoscopy while on rest of the screening categories they remained negative. Sigmoidoscopically diagnosed 4 cases of colonic malignancy remained positive on all the screening categories. The

4 cases of ulcerative colitis which diagnosed on sigmoidoscopy, were also positive on biopsy in all the 4 cases.

while these were positive in only 2 cases (50%) on barium enema and in 3 (75%) cases on stool examination. So the cases of colonic malignancy only remained positive in 100 percent cases in all these four screening categories.

TABLE XVIII : Sigmoidoscopic and pathological findings in 20 patients with amoebic colitis.

Sl. No.	Sigmoidoscopy		No. of cases	Pathology	
	Description	Extent		Stool	Biopsy
1.	Loss of vascular pattern with diffuse hyperaemia, oedematous mucosa.	Sigmoid colon with rectal sparing	4	Stool +ve for cysts of E. Hystolytica	—
2.	Loss of vascular pattern with mucosal hyperaemia mucous exudate collected around the sigmoidoscope.	Sigmoid and rectum.	10	Mucus exudate showed cysts of E. Hystolytica.	—
3.	Patchy mucosal hyperaemia with mucosal oedema with thread worms in the lumen.	Rectum and sigmoid colon.	2	Stool +ve for cysts of E. histolytica.	—
4.	Mucosal hyperaemia discrete round ulcers with normal intervening mucosa with thread worms.	Rectum and sigmoid colon.	4	—	Biopsies from discrete ulcers show E. Hystolytica.

Table XVIII shows sigmoidoscopic and pathological findings in 20 patients with amoebic colitis. Among the 20 cases, 4 cases of amoebic colitis showed the similar findings as described in Sl.No. 1, Stool in all the 4

cases was positive for *E. histolytica*, but colonic biopsy did not show any abnormality. 10 cases of amoebic colitis had shown the similar findings as described in Sl.No. 2. Stool examination in these 10 cases was as such normal but mucous exudate taken from sigmoidoscope showed cysts of *E. histolytica*. Colonic biopsy did not show any abnormality in all these cases. 2 cases of amoebic colitis had shown the similar findings as described in Sl.No. 3. Stool was positive for cyst of *E. Histolytica* in all these 2 cases, but colonic biopsy did not reveal any abnormality. 4 cases of amoebic colitis have shown the discrete ulcers. Biopsies from these ulcers have shown the *E. histolytica*. Stool examination, in all these 4 cases, did not show any abnormalities. Barium enema was normal in all these 20 cases of amoebic colitis.

Table XIX shows sigmoidoscopic, pathological and barium enema findings in 4 patients with ulcerative colitis. In all the 4 cases colonic biopsy revealed the presence of fair number of plasma cells which was diagnostic of ulcerative colitis. While barium enema was positive in only 2 moderately severe cases, which was characterised by loss of haustration (tubular colon) involving sigmoid, and ascending colon upto splenic flexure. Stool examination showed pus cell and few RBCs in only these three cases.

TABLE XIX : Sigmoidoscopic, pathological and barium enema findings in 4 patients with ulcerative colitis.

Sl. No.	Sigmoidoscopy		No. of cases	Colonic biopsy	Barium enema
	Description	Extent			
1.	Loss of vascular pattern friable mucosa, patchy areas of spontaneous haemorrhage discrete ulcers are present, intervening mucosa is inflamed (moderately severe)	Rectum and sigmoid-colon	2	Colonic mucosal gland are within normal limits, interglandular tissues shows dense mononuclear infiltration with fair number of plasma cells.	Loss of haustration in sigmoid and ascending colon up to splenic flexure.
2.	Generalised oedematous mucosa with mucosal friability, no discrete ulcers (moderate)	Rectum and sigmoid colon	2	Colonic mucosal glands showed slight hyperplasia with fair numbers of plasma cells.	Normal barium enema study

TABLE XX : Sigmoidoscopic findings in 2 patients with pseudomembranous colitis.

Sl. No.	Description	Extent	No. of cases
1.	Mucosal oedema loss of vascular pattern. A yellow membrane is seen covering most of the mucosal surface.	Upper rectum and part (3-4 cms) of sigmoid mucosa	1
2.	Mucosal hyperaemia present small elevated yellow plaques are seen with intervening oedematous and inflamed mucosa.	Sigmoid colon with rectal sparing	1

Sigmoidoscopic findings in two cases of pseudomembranous colitis are described in table XX. Stool, biopsy and barium enema did not reveal any abnormalities in either of these two cases.

TABLE XXI : Sigmoidoscopic findings in 6 patients with irritable bowel syndrome.

Sl. No.	Description	Extent	No. of cases
1.	Passage of scope was painful, markedly increased peristalsis in rectum and sigmoid. Moderate amount of mucus is present. Mucosa of rectum and sigmoid is normal.	Rectum and sigmoid colon	2
2.	Intense pain on passage of scope, markedly increased peristalsis in sigmoid is seen, excessive mucus secretion is present. No mucosal hyperaemia.	Sigmoid colon sparing rectum	2
3.	Insertion of scope was painful. Marked bowel contraction in rectum and sigmoid. There is a presence of excessive amount of mucus with bubbling during muscular contraction. Mucosa of rectum and sigmoid is healthy.	Rectum and sigmoid colon	2

Sigmoidoscopic findings in 6 patients of irritable bowel syndrome are described in table XXI. Intense pain during the passage of sigmoidoscope was common in all the 6 cases. However, all the painful conditions of Anorectum (piles, fissure, abscess etc.) had already been excluded. Stool, biopsy and barium enema did not reveal any abnormalities in either of these cases.



TABLE XXII : Sigmoidoscopy and pathological findings  
in 4 cases with bacillary dysentery.

Sl. No.	Description	Extent	No.of cases	Pathology	
				Grams staining	Stool culture
1.	Mucosal hyperaemia Pin head sized ulcers, bleeds on touch, intervening mucosa is mildly inflamed, some thread worms were also seen.	Rectum and sigmoid	2	Gram negative bacilli	E.Coli
2.	Loss of vascular pattern. Pin head sized ulcers, intervening mucosa is inflamed. Thread worms were also seen.	Sigmoid colon with rectal sparing	1	Gram negative bacilli	Shiegella
3.	Mucosal hyperaemia, pin head sized ulcers intervening mucosa is inflamed. Thread worms were also seen.	Sigmoid colon and rectum	1	-	Sterile

Sigmoidoscopic findings in 4 cases with bacillary dysentery are described in table XXII. All the cases were along with thread worms infestation. In first 2 cases stool culture showed the presence of *Escherischia coli*. In third case *Shiegella* was present in the stool culture. In the fourth case stool culture was sterile but the presentation of symptoms were acute (Table VI). Along with these sigmoidoscopic findings mentioned above for fourth case and subsequently therapeutic response was also seen in this case. These favour bacillary



dysentery as the case. Barium enema, biopsy did not reveal any abnormalities in either of these cases.

Sigmoidoscopic findings in both 2 cases, of sigmoid diverticulæ are described in table XXIII. Barium enema in both these cases showed typical diverticula without evidence of inflammation and stricture. Saw tooth irregularity of the lumen was also seen, which simply reflects muscle spasm. Colonic biopsies in either of these two cases did not reveal any malignant changes in the diverticula. Stool examination was negative for any pus cells or RBCs in all the two cases.

Sigmoidoscopic, pathological and barium enema findings in 4 patients with colonic malignancy are shown in table XXIV. In the second case the stricture was present at a distance of 15 cms from anal verge. This patients undergone for anastmosis surgery for carcinoma colon some 6-7 years back later on developed stricture which was malignant as described above in colonic biopsy findings. Stool examination had shown the fair numbers of RBCs in all the 4 cases.

TABLE XXIII : Sigmoidoscopic, barium enema and pathological findings in 2 patients with sigmoid diverticulae.

Case No.	Description	Extent	Barium enema	Colonic biopsy
1.	Multiple 1 to 2 cms large diverticula seen in sigmoid colon which contains foecal matters mucous tags redundant\$ out some diverticula. The floor of diverticula is shining white. No mucosal hyperaemia.	Sigmoid colon	In both two cases barium enemas show typical diverticula without inflammation and stricture There is a saw tooth irregularity of the lumen are also seen.	Normal mucosal pattern
2.	Sac like protrusion (3-4 in numbers) of mucosa through the muscularis seen, Mucosa is healthy.	Sigmoid colon		Normal mucosal pattern

TABLE XXIV : Sigmoidoscopic, pathological and barium enema findings in 4 patients with colonic malignancy.

Case No.	Description	Extent	Barium enema	Colonic biopsy
1.	Annual growth present 10 cms from anal verge filling the posterior 2/3 portion of sigmoid colon. Anterior 1/3 is free, frank blood discharge is present. Foul smelling was present.	Sigmoid colon	Filling defect with area proximal to growth is dilated.	Adenocarcinoma.
2.	Scope is impassable beyond 15 cms from anal verge due to stricture. Mucosa upto 15 cms is normal frank blood discharge is present.	Sigmoid	Barium refluxing to exterior	glandular proliferation with hyperchromatic nucleus. Polymorphism is present. Well differentiated cells are seen.
3.	Irregular greyish white cauliflower growth present at 10 cms from anal verge. Multiple haemorrhagic points are seen, growth filling the 1/3 area of sigmoid colon.	Sigmoid colon	Filling defect with proximal dilatation of colon	Mucoid adenocarcinoma.
4.	Greyish white irregular growth present at 15 cms from anal verge involving whole of the sigmoid lumen growth extending upto upper rectum, bleeds on touch.	Sigmoid colon and upper rectum	Colon proximal to growth is not visualised.	Squamous cells carcinoma (well differentiated)

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## DISCUSSION

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## DISCUSSION

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Sigmoidoscopy and the barium enema examination have historically been extremely valuable diagnostic tools in the study of colonic diseases. Since the barium enema provided an examination far beyond the capability of sigmoidoscopy, which could be used to directly examine the more difficult areas of radiologic evaluation, the two techniques were obviously found complementary (Miller, 1982). Present study also confirms this observation. Each technique has its advantages and disadvantages. Unfortunately, either of the procedure is not 100% sensitive.

Performance of sigmoidoscopy before barium enema examination of the colon has long been a standard advice in clinical gastroenterology. In particular, sigmoidoscopy can detect inflammatory and neoplastic conditions more quickly and reliably than a barium enema (Donald et al, 1985). In cooperation with the radiology department it was insisted in the present study that all patients should undergo sigmoidoscopy before barium enema.

Several studies have compared the sensitivity and specificity of the radiologic and sigmoidoscopic examinations of the large bowel and have emphasised the falliability and complementary nature of the two investigations (Saunders et al, 1971 and Wolff et al, 1975).

In 1982, Dyer asserted that "a barium enema is still a pre-requisite for sigmoidoscopic examination" whereas Williams (1984) from the very large series at St. Mark's Hospital, stated "Except where there is active inflammatory bowel disease it can be argued that a high probability of disease is an indication for sigmoidoscopy."

In the present series, 54 cases were evaluated with symptoms suggestive of lower gastrointestinal diseases. Forty two cases showed abnormal sigmoidoscopic findings, while the rest 12 cases, who were found normal on sigmoidoscopy were also normal on barium enema examination. There were 20 (37.04%) cases of amoebic colitis, 8 (14.82%) of them also had thread worms infestation. The majority of these cases were in the age group of 11-30 years. None of these cases revealed any abnormal findings on barium enema examination. There were 4 (7.4%) cases of ulcerative colitis, 2 (3.7%) cases had moderately severe diseases and the rest two cases had moderate disease on sigmoidoscopic examination. The two moderately severe cases were found to have involvement of colon upto the splenic flexure on barium enema examination. All the cases of ulcerative colitis were males in the age group of 21-30 years. and 41-50 years. There were two (3.7%) cases of pseudomembranous colitis detected on sigmoidoscopy. Both were females in the age group of 11-20 years. These two cases on barium enema examination were found normal. There were 6 (11.11%) cases of irritable bowel syndrome diagnosed by sigmoidoscopy



alone, 4(7.4%) males and 2(3.7%) females, the majority of these cases were in the age group of 21-30 years. There were 4(7.4%) cases of colonic malignancy diagnosed by both, barium enema and sigmoidoscopy, all these cases were males in the age group of 61-70 years. The 4 cases of bacillary dysentery with thread worms infestation were also detected by sigmoidoscopy alone, 2(3.7%) of them were males and rest 2(3.7%) were females. The 2(3.7%) cases of sigmoid diverticular disease were detected by both sigmoidoscopy and barium enema, both were the males in the maximum age group of 51-60 years.

In the present study, the sigmoidoscopy was undoubtedly better as a first line investigation in the detection of colonic diseases. The total diagnostic yield for initial sigmoidoscopy was significantly greater than for initial barium enema examination ( $8/54=14.8\%$ ). No patients sustained a major complication and none required urgent admission or treatment as a result of their investigation, confirming the known safety of both procedures, which is consistent with studies of Gelfand (1980) and Abrams (1982).

Hughes (1957) states that 25% sigmoidoscopies fail to go to the full length of 25 cms while Jackman (1958) quotes 14.8% of failure. In contrast to these studies full insertion upto 25 cms failed in 22.2% of our examinations. Scope was passed to full length of 25 cms in 44.44% of our cases.

The frequency with which the rigid sigmoidoscope could be used to examine beyond the rectosigmoid junction in the present series (33.4%) was similar to that reported by others (Bohlman et al, 1977 and Madigan and colleagues, 1968).

Studies from various regions (showing in following table) suggest that the incidence of ulcerative colitis was rising before 1960 (Sedlac et al, 1972 and Evans and associates, 1965) but has been steady over the past 20 years (Gilat et al, 1974, Bonnevie et al, 1968 and Binder et al, 1978). Two recent studies from the United Kingdom (Sinclair et al, 1980 and Devlin et al, 1980) are exceptional and showed a very high and rising incidence of ulcerative colitis.

TABLE : Showing incidence of ulcerative colitis from various regions.

Regions	Authors	Incidence(%)
U.S.A.: Minnesota	Sedlac et al, 1972	7.2
New Zealand: Wellington	Wigley & associates, 1962	5.6
U.K. : Oxford	Evans & associates, 1965	6.5
Norway	Myren et al, 1971	2.6
U.S.A. : Baltimore	Monket et al, 1967	4.6
Israel : Tel Aviv	Gilat et al, 1974	3.6
Denmark : Copenhagen	Bonnevie et al, 1968	7.3
U.K. : NE Scotland	Sinclair et al, 1980	11.3
U.K. : North Tees	Devlin et al, 1980	15.1
Denmark : Copenhagen	Binder et al, 1982	8.1
U.K. : Cardiff	Morris & associates, 1984	7.2
India: Bundelkhand region.	Present study, 1989-90	7.4

The diagnostic yield from rigid sigmoidoscope for adenocarcinoma of sigmoid colon in symptomatic patients had been reported as 4.6% (Leicester et al, 1983) Vellacott et al (1982) reported, this figure to be 2.3%, they have not included large low rectal cancer in this group. Others (NILS et al, 1986, Bolt et al, 1971, Christian Son et al, 1951 discovered adenocarcinoma 2% by the rigid sigmoidoscope. In the present series the adenocarcinoma of sigmoid colon discovered in 2 (3.7%) out of 4 (7.4%) patients of colonic malignancy.

An alternative approach for detection of colonic malignancy, has been the wide spread use of occult blood testing. In patients with bleeding per rectum a yield for colonic carcinoma of 4.6% has been reported (Leicester et al, 1983). In the present study with symptoms (bleeding per rectum) a yield for colonic carcinomas was 7.4%. Screening for colonic carcinoma by stool occult blood testing has a sensitivity of 75% (Hardcastle et al, 1983). In this present study it was as high as 100%. Hence possibly a combination of sigmoidoscopy and stool occult blood testing will produce the best detection rate for colonic carcinoma.

It has also been emphasised by several authors that 75% of all colorectal carcinomas are found within the reach of rigid sigmoidoscopy (Lefall, 1974; Rosato and colleagues, 1981) while in the present study it has been seen that all the 4 cases (7.4%), who presented with bleeding per rectum and later on diagnosed as a case of colonic malignancy, were all within the reach of sigmoidoscopy. Taylor et al (1987) contend that patients with

colonic carcinoma above 15 cms whose condition are diagnosed using flexible sigmoidoscopy should, prior to surgical resection, undergo rigid sigmoidoscopy to rule out a more distant lesion missed by the flexible instrument. They base their contention on their clinical experience with two patients each of whom had distal colon carcinoma that were missed by flexible sigmoidoscopy and subsequently seen by rigid sigmoidoscopy. They suggest that rigid instruments may be better able to detect such lesions because of the straightened configuration that bowel is forced to assume. With these observations, they finally suggest that Don't be rigid about flexible sigmoidoscopy.

Assessment of malignant lesion by direct visualization with subsequent confirmatory biopsy may also make some barium enemas unnecessary, because a tight constricting lesion will prevent satisfactory barium enema examination of the whole colon(Vellacott et al, 1982) as in our 1(1.85%) case because of presence of malignant stricture at a distance of 15 cms from anal verge barium refluxed out to exterior and whole colon could not be visualized.

Diverticular diseases are assessed in the present study by the sigmoidoscopy and later on clearly seen in radiograph along with narrowed irregular bowel lumen. Good correlation was found between the sigmoidoscopy and radiographic findings in this study, as has

been found by Velloacott, Amar and Hardcastle (1982).

The presence of diverticular disease makes the diagnosis of an associated lesion more difficult (Vellacott et al, 1982; Boulos et al, 1984). Some authorities recommend that sigmoidoscopy should be performed in all patients with symptomatic diverticular disease. Another important group comprises of patients with diverticular disease demonstrated radiographically, a sigmoidoscopic examination must be performed in all these cases to exclude polyp or cancer (Abrams, 1982; Aldridge and Sim, 1986). In contrast to these series, in the present study it was seen that no cases, which were found as diverticular diseases on radiograph, were later on found as polyp or cancer by sigmoidoscopy and subsequent colonic biopsies respectively.

Several studies have addressed the question of the sensitivity and specificity of barium enema examination and sigmoidoscopy (Vellacott et al, 1982 and Bennett, 1981) as in present study also, it has been seen that sigmoidoscopy cannot be used as the gold standard (Ott et al, 1985) since pathological examination of the whole colon could not be possible by sigmoidoscope alone. Barium enema has been seen to miss 59.2% of over all inflammatory bowel lesions (Amoebic colitis, bacillary dysentery, pseudomembranous colitis, irritable bowel syndrome) and even 3.7% of cases of moderate ulcerative colitis. Four cases of ulcerative colitis were detected sigmoidoscopically in the



present study. Two of them were moderately severe and two were moderate. Established disease was confirmed radiologically in two moderately severe cases. It appears that early inflammatory bowel disease can be quickly recognised sigmoidoscopically before changes detectable by barium enema.

The advantage of taking biopsy specimens for histological examination is a strong argument in favour of the sigmoidoscopic technique (Williams, 1984) as in our colonic malignancies cases to confirm the diagnosis and in diverticular diseases to exclude the malignancy. In our diverticular cases and in cases of colonic malignancies, the combined sensitivity of the radiologic examination and sigmoidoscopy was 100%, which emphasizes their complementary roles (Ott et al, 1985).

It has been demonstrated in the present study that patients with bright red rectal bleeding may be adequately investigated by sigmoidoscopy and or barium enema, as the statistical value for this symptom, with reference to sigmoidoscopy was significant ( $\chi^2=2.78$ ; d.f.=1,  $p \leq 0.05$ ), and with reference to barium enema examination was also significant ( $\chi^2=33.28$ , d.f.=1;  $p \leq 0.001$ ). Similarly the patients presenting with loose stools should be adequately investigated by sigmoidoscopy alone as the statistical value for this symptom, with reference to sigmoidoscopy was significant ( $\chi^2=4.89$ , d.f.=1,  $p \leq 0.05$ ) while with reference to barium enema



examination was insignificant ( $\chi^2=3.37$ , d.f.=1,  $p > 0.05$ ). These data indicate that substantial numbers of patients with symptoms of loose stools and bleeding per rectum, if adequately endoscoped, will be saved from barium enema examination.

In the present study the statistical value of different symptoms (viz, weight loss, pain in abdomen) with reference to those two techniques were also assessed in table VIII, X, XIII and XV. However, in none of these symptoms, either of these techniques were found superior to the other. As probably no other workers have correlated, in such a way, the sigmoidoscopy and barium enema examination in relation to various lower gastrointestinal symptoms, it again requires further exploration in this direction.

The wide spread application of rigid sigmoidoscopy and the painstaking works of Morson (1976) and others (Lane et al, 1979; Bolt, 1971; and Williams, 1974) have identified the importance of adenomatous polyps in the genesis of colorectal cancer. Mass screening studies in asymptomatic individuals, using the rigid sigmoidoscope have shown that the removal of all asymptomatic adenomatous polyps found at routine sigmoidoscopy will result in both a decline in the incidence of rectal cancer and improved survival in those asymptomatic

individuals who do develop a malignancy. Unfortunately in the present study asymptomatic individuals were not evaluated.

Despite the assets of colonoscopy, facilities for this investigation are not available in our many hospitals. Most of the colonoscopists however, agree that a good quality barium enema and sigmoidoscopy should remain the primary examination for patients with suspected lower gastrointestinal diseases. Wolff et al (1975) believed that "colonoscopy serves as a background procedure to the barium enema". As we find in our 2(3.7%) cases of moderately severe ulcerative colitis, barium enema alone was able to visualize the proximal extension of disease, and forx further confirmation of disease, deep mucosal biopsy had been taken through the sigmoidoscope itself, so no further necessity remain left for these patients to undergo subsequent colonoscopy. However, the recognized value of colonoscopy, in polypectomy (removal of polypoid lesion by electrocautry) in less time, cost, patient risk and radiation exposure, cannot be under estimated.

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S U M M A R Y   A N D   C O N C L U S I O N S

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## SUMMARY AND CONCLUSIONS

1. Among the different lower gastrointestinal diseases the amoebic colitis is quite common in this part of the country, which can be well interpreted by the observation that 37.04% of all cases undergoing sigmoidoscopy in the present study had amoebic colitis.
2. We did not find any age or sex predilection of different lower gastrointestinal diseases except the colonic malignancies, which were present in 6-7 decades of life with preponderance in males.
3. Sigmoidoscopy has been found to be a simple, safe, cheap and quick procedure and it can usually be carried out without prior bowel preparation in any clinic. No complications of technique were seen in present series.
4. Sigmoidoscopic visualisation of stools without prior bowel preparation can also be of considerable value in that it may show blood, mucus, worms indicating evidences of particular disease or have the typical appearance associated with irritable bowel syndrome.
5. Unlike barium enema, the advantage of taking biopsy specimens for histopathological examination to confirm the diagnosis, are strong arguments in

favour of sigmoidoscopic technique.

6. In present study, the sigmoidoscopy was undoubtedly better as a first line investigation in the detection of colonic diseases, as the total diagnostic yield obtained by barium enema examination was only 8/54 (14.8%) as compared to 42/54 (77.8%) by sigmoidoscopy.
7. However, we must not negate the recognised value of good quality of barium enema as in our sigmoid diverticular disease cases and colonic malignancy cases, both the technique were proved equally sensitive.
8. Inflammatory bowel disease, in early stages can quickly be recognized by sigmoidoscope before changes detectable by barium enema examination, as two (3.7%) of our four (7.4%) cases of ulcerative colitis detected on sigmoidoscopy had normal barium enema. And also in our all cases of amoebic colitis, IBS, pseudomembranous colitis and bacillary dysentery, barium enema did not reveal any abnormality, which simply shows the feasibility of sigmoidoscopy as a first line procedure without barium enema study in these lower gastrointestinal diseases also.
9. In the present study it had been shown that the patients, who present with loose stools and or with

frank or occult bleeding per rectum, (as demonstrated by significant "p value" of each (  $p \leq 0.05$ ) in table IX and XI), if adequately investigated by sigmoidoscopy alone would result in a substantial number of patients being saved from a barium enema examination. For this reason and for reasons of accuracy and expediency and to avoid multiple investigations, sigmoidoscopy may be preferred as initial investigation for those with symptoms suggestive of lower gastrointestinal diseases.

10. Barium enema is necessary for investigation of those areas proximal to an impassable flexure and in patients with ulcerative colitis to know the extent of disease, as in present study 2 (3.7%) moderately severe cases of ulcerative colitis were found to involve the colon upto splenic flexure.
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B I B L I O G R A P H Y

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B I B L I O G R A P H Y

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A P P E N D I X

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APPENDIXA STUDY OF SIGMOIDOSCOPY VERSUS BARIUM ENEMA IN THE EVALU+  
ATION OF DISEASES OF LOWER GASTROINTESTINAL TRACT

Date :

WORK SHEET

Sl. No.

Wd/Bed No.

MRD/OPD No.

D.O.D.

D.O.A.

Details of patient

Patient's Name:

Age/Sex

Residence :

Occupation :

Date of first visit :

Chief complaintsPain in Abdomen

Yes/No

Duration of pain

Character of pain colicky/dull ache -

Site of pain- upper/lower abdomen -

Relation of pain with meals/defection/drugs -

Loose Stools

Yes/No

Duration -

Frequency -

With/without mucus, or blood(Frank blood,  
blood mixed stool or melaena).

Amount - (Small/moderate/large) -

Whether sticks to lavatory pain -

Feeling of incomplete evacuation-

Tenesmus -

Others -

Constipation

Yes/No

Duration -

Medication -

Others -



BLEEDING PER RECTUM

Yes/No

Duration

Amount

Form of bleeding

Weight loss

Yes/No

Duration

Amount

Fever

Yes/No

Duration

Type

ANOREXIA/NAUSEA/VOMITING/HAEMATEMESIS/ERUCTION-  
SYMPTOMS RELATED TO OTHER SYSTEMSTreatment - History (if any)EXAMINATIONSa. General Examination

Height

Weight

General condition

B.P.

Pulse rate

Temperature

Pallor

Icterus

Clubbing

Cyanosis

Oedema

L.Nodes

b. Systemic Examination

Respiratory system

C.V.S.

C.N.S.

AbdomenSkin over abdomen (visible veins/direction  
of flow of blood).

Distension

Site

Ascites (Present/Absent) Degree

Liver - (palpable/Not palpable):

Surface

Tenderness

Upper border of liver -

Spleen(Palpable/Not palpable)

Size :

Hernial sites



PROVISIONAL DIAGNOSISINDICATION OF SIGMOIDOSCOPYSIGMOIDOSCOPIC FINDINGS

Sl. No.

Inspection of perineum

Skin around perineum -

Piles/fistula

Per rectal examination

- . Tone of sphincters (Relaxed/Normal)
- . Pain : Yes/No
- . Haemorrhoids
- . Prostate/Seminal vesicles)
- . Growth/stricture
- . Sigmoidoscopy

MUCOUS MEMBRANE

- a. Glistening lustre (Normal/Absent).
- b. Colour -
- c. Oedema -
- d. Vascular pattern - visible/Non visible/Hyperraemia
- e. Granularity - Present/Absent.

Ulcers - Present/Absent

- Shallow/Deep

Floor - (Red/white/black/brown)

Fresh - Bleeding/pus

Intervening mucosa - (Normal/inflamed)

Biopsy - (Taken/not taken)

No.

Date :

Pseudomembrane - Present/Absent

- Blood on removal - Yes/No

- Swab taken (report) -

Strictures : - Present / Absent

- Length of stricture

- Site

Polyps - Sessile/pedunculated  
 - Size  
 - Single/multiple/numbers -  
 - Distance (site)

Growth - Present/Absent  
 - Distance  
 - Types (ulcerative/Cauliflower/Stenosing)  
 - Passable/impassable  
 - Extent (% of circumference)  
 - Friability  
 - Biopsy (taken/nor taken)  
 - Biopsy (report)

BARIUM - ENEMA FINDINGS

(No. / Date )

- (i) Caecum
- (ii) Ascending colon
- (iii) Transverse colon
- (iv) Descending colon
- (v) (a) Splenic flexure
- (b) Pelvic colon
- (c) Rectum & Anal canal

OTHER INVESTIGATIONS

TLC , DLC, Hb, ESR/Stool

Serum proteins :

TREATMENT TAKEN

RESPONSE (FOLLOW UP)

REPEAT SIGMOIDOSCOPY

Dates	1	2	3
Findings			

Remarks

Summary